CANADIAN MACHINERY
AND MANUFACTURING NEWS

A weekly newspaper covering in a practical manner the mechanical power, foundry and allied fields.
Published by the MacLean Publishing Company, Limited, Toronto, Canada

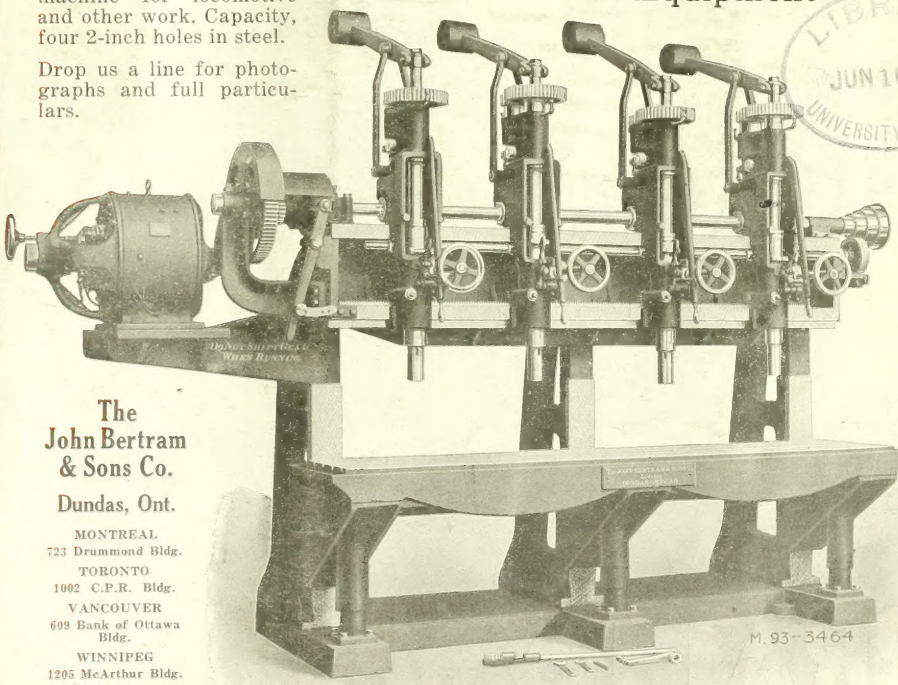
Vol. XXII., No. 13. Publication Office: Toronto, September 25, 1919 Subscription Price $3.00 per year.

BERTRAM MACHINE TOOLS

Locomotive and Car Shop Equipment
Structural and Bridge Shop Machinery
Repair Shop Machinery
General Machine Shop Equipment

Illustration shows our 4-spindle multiple drilling machine for locomotive and other work. Capacity, four 2-inch holes in steel.

Drop us a line for photographs and full particulars.



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You can't help noticing the good qualities of Pratt & Whitney Taps

Their free cutting qualities, their extreme accuracy and their extraordinary ability to outlive others distinguish them.

The con-eccentric relief—a distinctive P & W feature—is the secret of their goodness. One-third of the cutting edge is concentric. The remaining two-thirds has eccentric relief. Taps can be sharpened at the only correct point—on the face of the cutting edge. Sharpening in no way affects their size.

Yes, they cost a little more than some others, but they're well worth the difference. Carried in stock as are all other P & W Small Tools at our sales offices and agencies as listed.

PRATT & WHITNEY COMPANY OF CANADA, LIMITED

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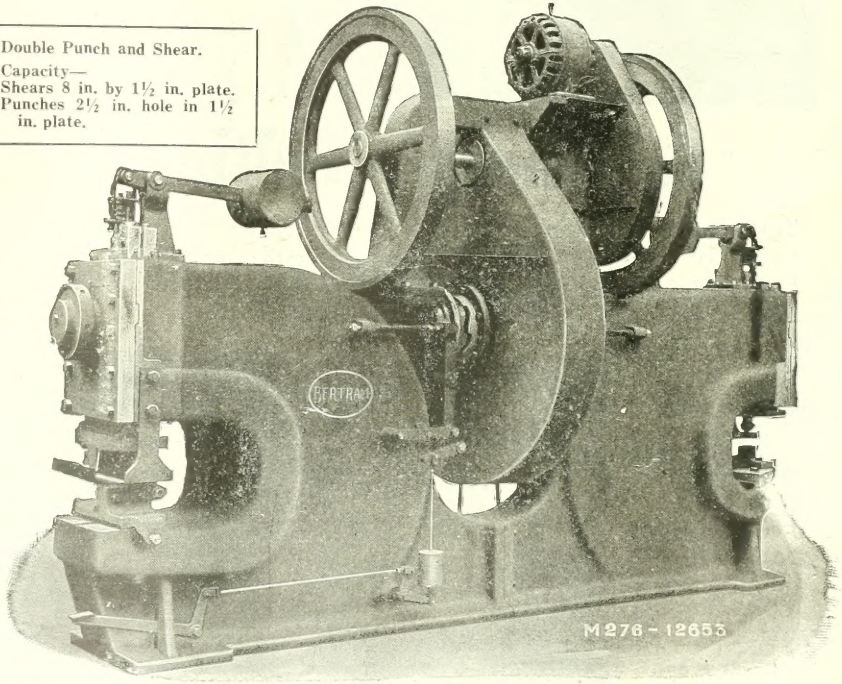
BERTRAM MACHINE TOOLS

For Structural, Bridge and Shipbuilding Plants

Modern in design and built for heavy service, our line embraces a varied equipment of Punches, Shears, Bending and Straightening Rolls, Coping Machines, Rotary and Plate Planers.

The assistance and advice of our engineers are yours for the asking.

Double Punch and Shear.
Capacity—
Shears 8 in. by 1½ in. plate.
Punches 2½ in. hole in 1½ in. plate.



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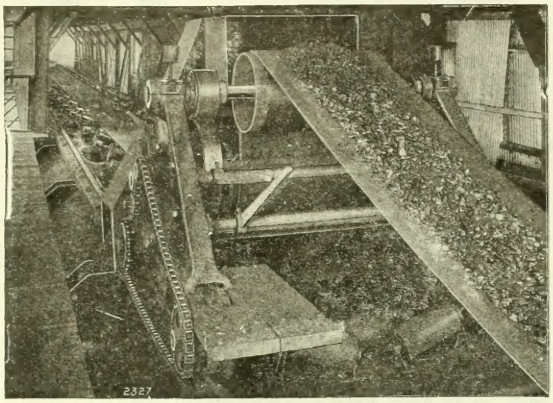
Canadian Machinery and Manufacturing News, September 25, 1919. Vol. 22, No. 13. Published weekly at 143-153 University Ave., Toronto, Canada. Subscription price in Canada, $3; United States, $3.50. Entered as second-class matter at the Post Office Department, Ottawa, Canada. Entered as second-class matter July 1, 1912, at the Post Office at Buffalo, under he Act of March 3rd, 1879.

BELTING



SCANDINAVIA BELTING

HAVE you ever been disappointed in your conveyor belts by their opening up at the plies? This is one of the commonest reasons for failure in a conveyor belt.

Is there a remedy? YES. Buy a belt that is not built up in plies. Such a belt is

Scandinavia Belting

This is a solid woven belt, made of long stock cotton, and it is built to wear. We have just had reports from two large users saying that Scandinavia Belting gives them more dollars in value for handling materials than any other belt they had ever used.

Use it for conveying

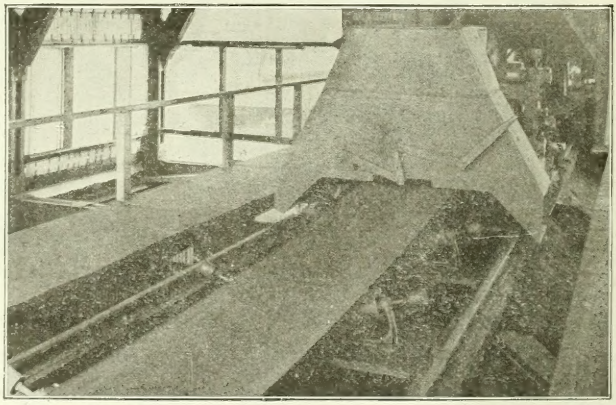
CRUSHED ORE

BROKEN STONE

COAL

QUENCHED COKE, Etc.

We want your business and solicit your inquiries.



FEDERAL ENGINEERING CO., LIMITED

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By Product Coke

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Open Hearth Steel Sheets

Quality

Drop Forgings

THE

STEEL COMPANY

OF

CANADA

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HAMILTON MONTREAL

Railway Fastenings

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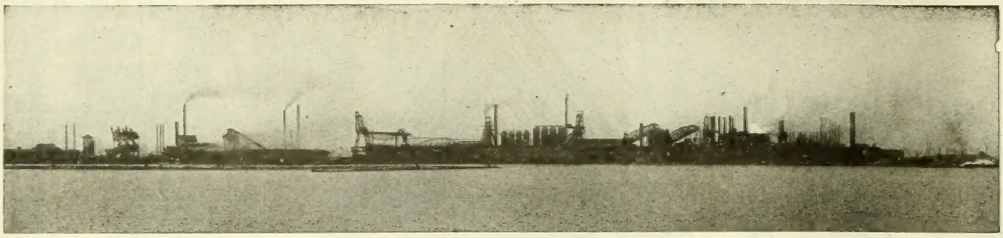

General View of the Plant of the Algoma Steel Corporation from the Waterfront.

ANNOUNCEMENT

THE ALGOMA STEEL CORPORATION, LIMITED, take pleasure in announcing to their customers and the Canadian trade that in accordance with the widespread desire throughout the Dominion that there should be obtained in Canada with Canadian labor, a much larger proportion of the requirements of this country in STEEL SECTIONS for STRUCTURAL PURPOSES, CAR CONSTRUCTION, SHIPBUILDERS' REQUIREMENTS, etc., they are just completing extensive alterations and additions to their rolling mills, and on or about 1ST NOVEMBER, will be ready to produce and ship American Standard Sections of BEAMS and CHANNELS up to and including 15", all standard sections of ANGLES from 6" x 6" down to 1¼" x 1¼", ZEE BARS for car builders and general purposes, small and large ROUNDS and SQUARES, and FLAT BARS up to 14" wide. The quality of the product is already well known to the trade, and is exclusively steel made by the Open Hearth process. and can be furnished in all grades from the softest rivet stock to high carbon special spring material. Motto: **"Quality and Service."**

The following are the sections which will be rolled:---

ANGLES—Equal Leg—
6 x 6"—5 x 5"—4 x 4"
3½ x 3½"—3 x 3"
2½ x 2½"—2¼ x 2¼"
2 x 2"—1¾ x 1¾"
1½ x 1½"—1¼ x 1¼"

ANGLES—Unequal Leg—
6 x 4"—6 x 3½"—5 x 4"
5 x 3½"—5 x 3"—4½ x 3"
4 x 3½"—4 x 3"—3½ x 3"
3½ x 2½"—3 x 2½"—3 x 2"
2½ x 2"

BEAMS—
15", 12", 10", 8", 6", 5", 4", 3".

CHANNELS—
15", 13", 12", 10", 8", 6", 5", 4", 3".

ZEES—
3¼ x 5 x 3¼ x 5/16
3 5/16 x 5 1/16 x 3 5/16 x ⅜"
3⅜ x 5⅛ x 3⅜ x 7/16"
3 1/16 x 4 x 3 1/16 x ¼"
3⅛ x 4 1/16 x 3⅛ x 5/16"
3 3/16 x 4⅛ x 3 3/16 x ⅜"
2 11/16 x 3 x 2 11/16 x ¼"
2¾ x 3 1/16 x 2¾ x 5/16"

ROUNDS—
All sizes from ½" up to and including 4".

SQUARES—
All sizes from ½" up to and including 3".

FLATS—
All sizes from 1 x ¼" up to and including 14" wide.

MINE RAILS—
All sections from 12 lbs. up to and including 45 lbs. per yard.

PIG IRON—
Machine cast FOUNDRY MALLEABLE and BASIC.

SULPHATE OF AMMONIA.
NITRE CAKE.

For the better convenience of customers who may find it necessary to secure rush shipments of particular items, they contemplate keeping a large stock of all the various standard sections constantly on hand, and to this end extensive warehouse facilities are being prepared.
Your enquiries and business will be appreciated.

ALGOMA STEEL CORPORATION

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Planers

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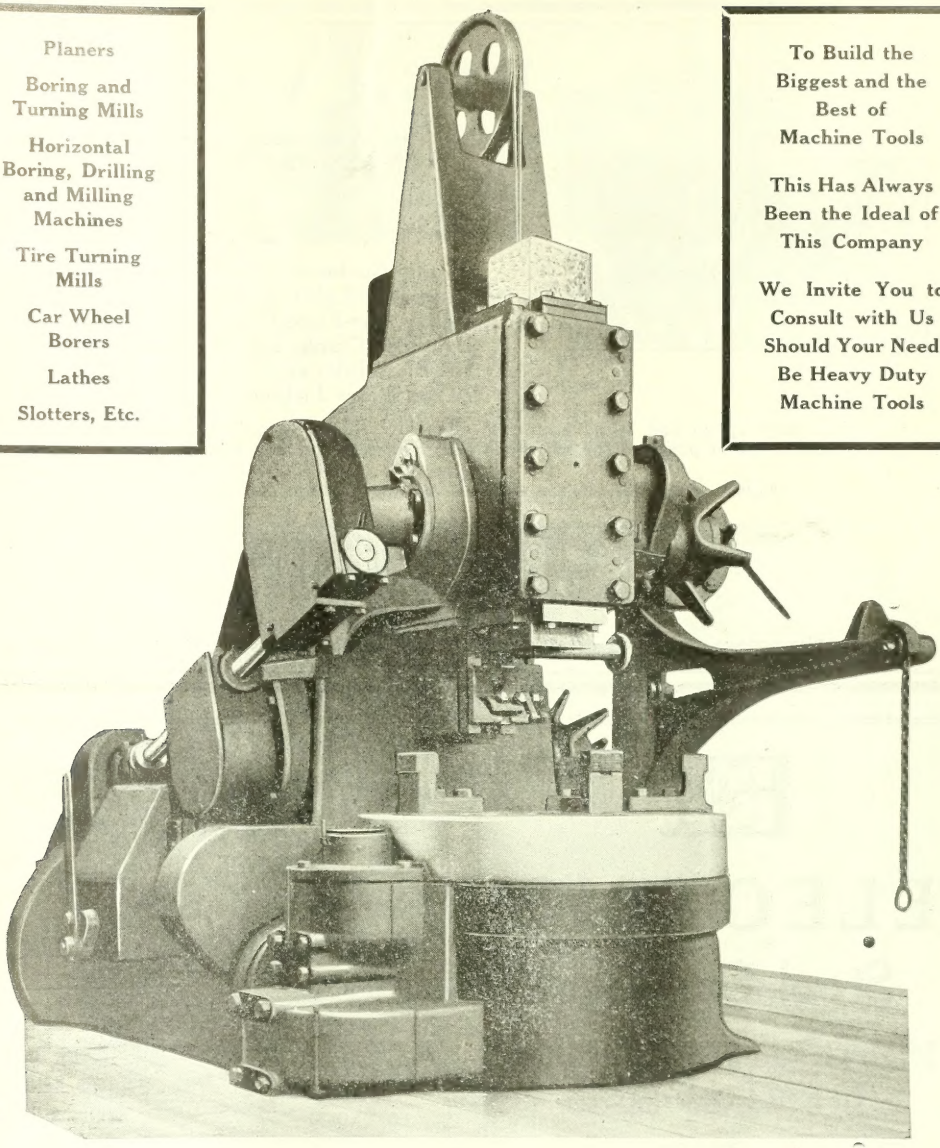
To Build the Biggest and the Best of Machine Tools

This Has Always Been the Ideal of This Company

We Invite You to Consult with Us Should Your Need Be Heavy Duty Machine Tools



BETTS MACHINE CO.

408 Blossom Road Rochester, N. Y.

HEAVY BETTS DUTY

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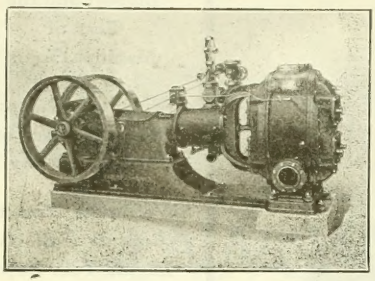

HIGH VACUUM

Can be efficiently and economically maintained by the use of ER-1 Dry Vacuum Pumps.

They are made in both steam and power driven models and embody many valuable features not usually found in machines of this class, such as:

Totally Enclosed Construction
Automatic Lubrication
Heavy One-Piece Frames
Balanced Cranks and Flywheels
I-R Plate Inlet and Discharge Valves
Large Water Jackets

Due to their high speed and high volumetric efficiency, they occupy two-thirds less floor space than any other type of pump of the same capacity, and require only a very simple foundation.

Bulletin 3137, points out how you can reduce your coal bill. Ask for a copy.

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Machine shop foremen and superintendents who invariably specify **"WILT"** when requisitioning tools know **WILT Drills, Reamers and Milling Cutters** are superior—are absolutely guaranteed against defective material and workmanship — are rigidly inspected before being shipped. To increase production, use **WILT Drills, Reamers and Milling Cutters.** Elimination of breakage alone will save you much.

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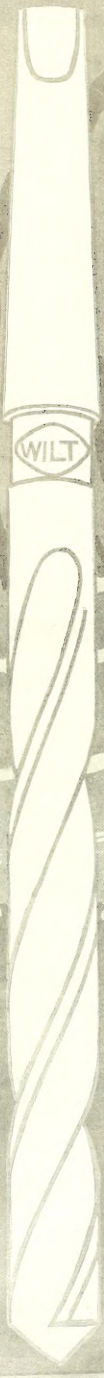

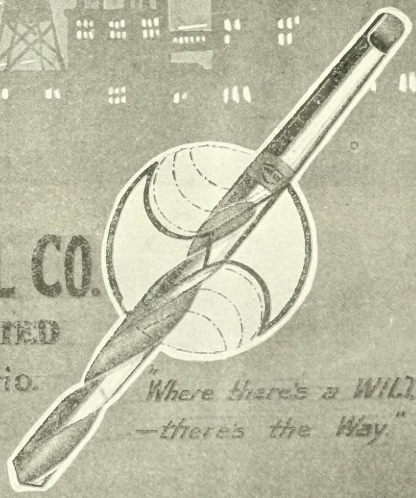

WILT TWIST DRILL CO.
OF CANADA, LIMITED
Walkerville, Ontario.

London Office: Wilt Twist Drill Agency, Moorgate Hall, Finsbury Pavement, London, E.C.2, Eng.

"Where there's a WILT —there's the Way."

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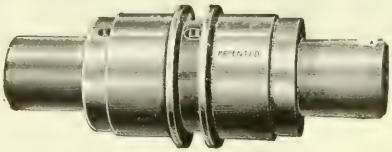
BUILT FOR LONG SERVICE



It takes time to do anything well, but the results usually justify the effort. Johnson clutches represent years of practice on one particular line. Our long experience in studying the demands of the trade, in refining our methods, in recording performances, and in selecting materials—all this is reflected in the present quality of our product.

Our engineers are at your disposal to help you with your clutch problems. Just send them your blue prints and they will do the rest. The Johnson clutch which they install will be correctly designed, properly rated, and honestly built. It will give that long and continuous service for which it is famous, and in which alone lies satisfaction.

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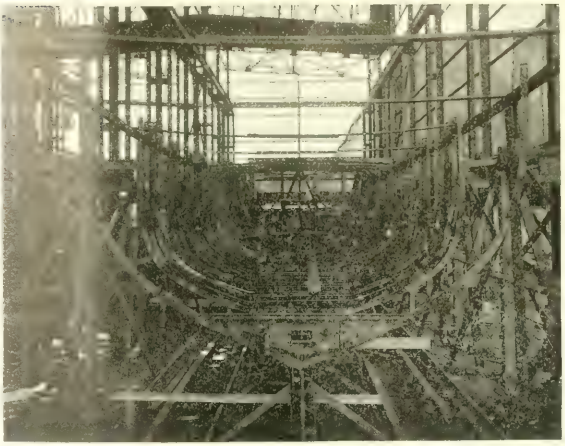

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Electrite

Electric furnaces, automatically regulated, the most modern methods, and **the introduction of Uranium** — make this a steel of truly remarkable cutting properties.

We know "Electrite" cannot be bettered — and stand ready to prove it to you.

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High Speed Steel

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PROMPT SHIPMENTS from large stock

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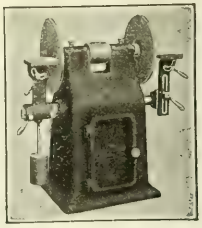
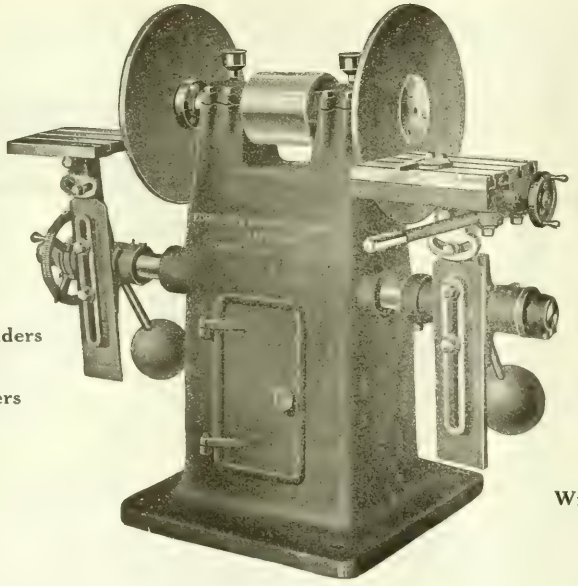


Ford-Smith Grinders



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Special Grinding Machinery
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Write for Catalogue and price list.

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Every Commercial Purpose

We are the only company in Canada producing steel ingots by the "HARMET" Liquid Process, a process that makes these ingots vastly superior to the ordinary kind, improving the physical properties and reducing the waste of ingot.

We can supply forgings of all shapes and sizes made of ordinary or "HARMET" Fluid Compressed Open-Hearth Steel on the Shortest Notice.

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by the
HARMET
Liquid Process

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MAGNOLIA ANTIFRICTION METAL

TRADE MARK

FOR ROCK CRUSHERS

LEBANON STONE CO.
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Magnolia Metal Co. 6/16/19.

Dear Sirs:—

Referring to your inquiry as to our experience with your MAGNOLIA BABBITT METAL would say that the writer has used this material exclusively for a number of years for general purposes, but more particularly, and in the largest quantity, for Pitman Bearings on an 18 x 36 Buchanan Crusher. This service is very severe and as these particular bearings are difficult to get to, we took care to see that we got a durable metal. To illustrate—One crusher we have been operating almost continuously for eight years, and during that period have found it necessary to babbitt the large Pitman Bearing only twice.

The above has been our experience, and from that we unhesitatingly recommend your metal.

Yours very truly,
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OFFICE and FACTORY: 225 St. Ambroise Street, MONTREAL

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"Red Cut Superior"

The Nationally Known FIRST QUALITY

HIGH SPEED STEEL

Is a Fighter for Efficiency in Peace Times and War Times.

Are your Tools made of "Red Cut"?

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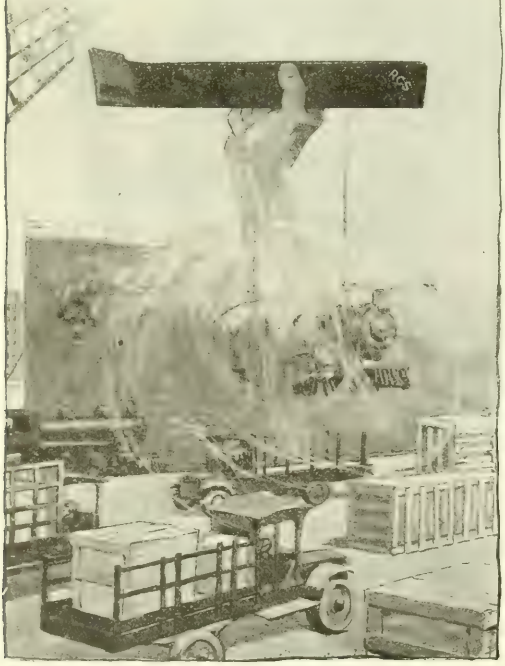

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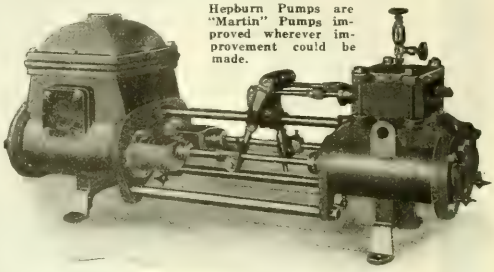
Our line embraces standard duplex pumps for boiler feeding and for fire and general service; tank or low service duplex pumps; duplex hydraulic pumps for service in connection with hydraulic lifts and presses, accumulators and oil presses; pressure or mine pumps; horizontal power pumps and air and circulating pumps, etc.

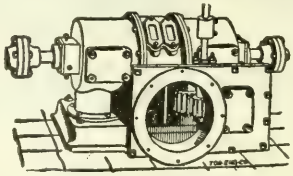


Hepburn Pumps are "Martin" Pumps improved wherever improvement could be made.

JOHN T. HEPBURN, LIMITED

18-60 Van Horne Street Toronto, Ontario

WATER POWER DEVELOPMENT



Over forty years' experience in designing and installing special turbines, both on vertical and horizontal shafts.

Can supply complete equipment, including flume, turbine and power transmission.

Stock of standard vertical shaft Little Giant Turbines on hand for prompt shipment.

We solicit your inquiries.

THE J. C. WILSON MFG. CO.
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NEVER WEAR OUT

PIPE THE WRENCH—WRENCH THE PIPE

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TOOL STEEL

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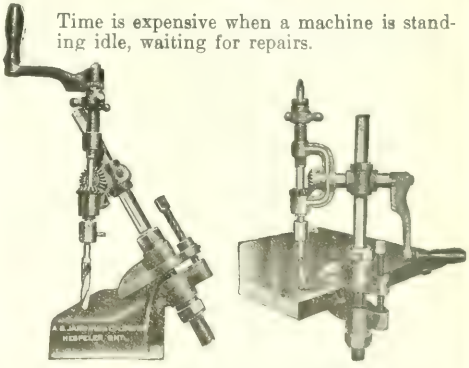
Jardine Universal Ratchet Drill

Time is expensive when a machine is standing idle, waiting for repairs.



On the average repair job, this machine completes the drilling in less than the time required to set an ordinary ratchet to begin.

Weight, 40 lbs. Price, $26.50 net

Sold by all Machinery and Supply Houses

A. B. JARDINE & CO., Limited
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HIGH SPEED STEEL

"WACO" TRADE MARK

TRADE MARK

"DOUBLE WACO" 18% Tungsten, for Railway and Tramway Tires and Hard Metals
"WACO" 14% Tungsten, for Turning, Planing and Slotting Tools, Milling Cutters, Taps, Rimers, Twist Drills

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Diamond Special Extra Best Quality Best Warranted Warranted Ordinary
Each quality supplied in different tempers to suit tool required

DIE STEELS
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In three qualities
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HOLLOW DRILL STEEL
Round or Octagon
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"WACO" High Speed Twist Drills Carbon Twist Drills

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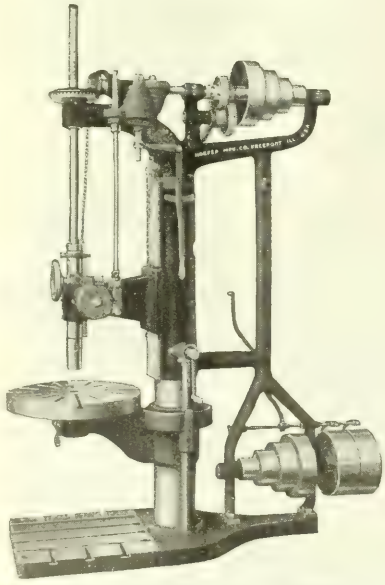
The Driller for Exact Work



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Enable Your Workmen to Eliminate Spoilage

The Hoefer Driller is pre-eminently the one to be found in the best plants. "It's almost as good as a Hoefer," so often heard in the machine and tool trade, indicates the position held by Hoefer Drillers.

Exact drilling, to the last thousandth of an inch, pays by eliminating spoiled material. Hoefer Drillers pay for themselves and increase the workman's pride in his work.

Twenty-five Years on Market

Twenty-five years making drillers has given Hoefer the "Know-how." The Hoefer Drillers are used by many of America's leading manufacturers. Equip your factory the Hoefer way. Take any kind of a drilling problem you have to the Hoefer Manufacturing Company, and the Company's experts can tell you how it was solved by other men, some of whom you may know.

Investigate now. Write to-day for catalog. The Hoefer engineers are at your service.

HOEFER MFG. CO.
FREEPORT, ILL.

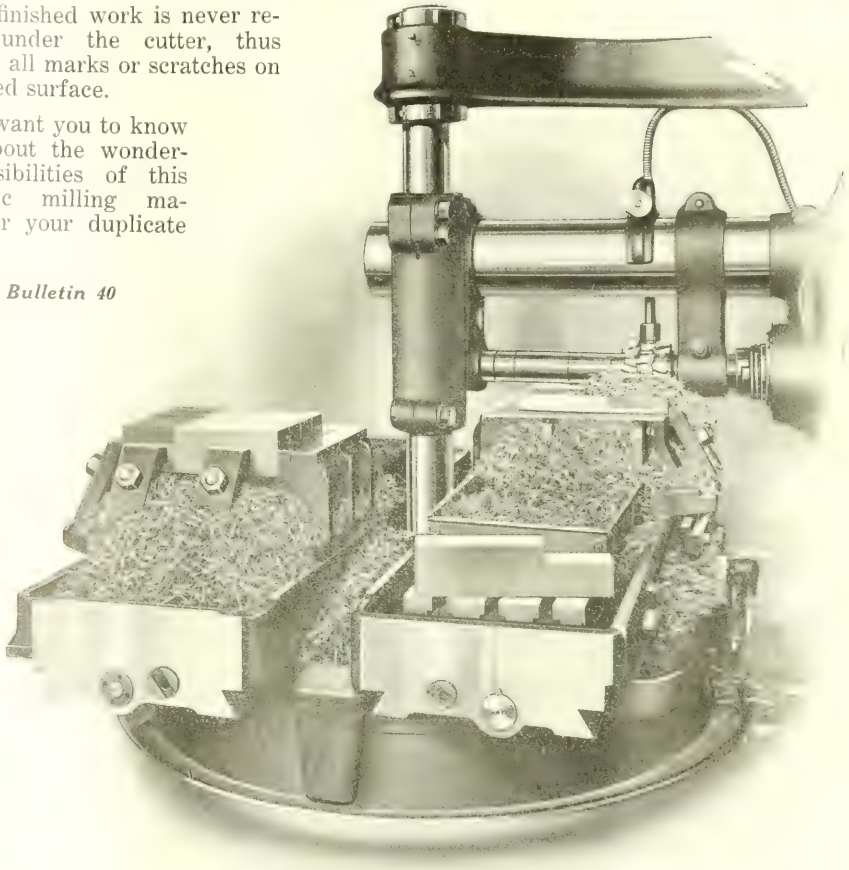
AUTOMATIC MILLING IS ECONOMICAL MILLING

Machine is always cutting metal. While the attendant is loading one vise or fixture the cutter is milling work carried on the second table.

The finished work is never returned under the cutter, thus avoiding all marks or scratches on the milled surface.

We want you to know more about the wonderful possibilities of this automatic milling machine for your duplicate milling.

Send for Bulletin 40



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Electric

No. 3

Of a Series of Technical Talks on Ball Bearings

THE upper diagram opposite shows the comparative space occupied by plain bearings and SKF Bearings, and demonstrates the compactness of an SKF Ball Bearing motor. Babbitt Bearings are usually designed with the box length two and one-half to three times the diameter of the shaft which they support. Contrasted with this, the length of SKF Ball Bearings along the shaft usually is not over one-third of the shaft diameter. Surrounding the ball bearings is a lubricant chamber, which at its outside limits is one-half to one-third shorter along the shaft than the plain bearing for the same motor, with the results that the overall length of motors can be reduced 10 per cent. to 20 per cent. by the employment of SKF Ball Bearings.

Owing to the elimination of friction and consequently of wear the use of SKF Ball Bearings, prevents the armature dropping on the pole pieces, for after long service these bearings show no measurable wear and the original air gaps are, therefore, maintained. Air gap clearances can thus be reduced—an important consideration in induction motors, resulting in higher efficiency.

For the successful employment of SKF Ball Bearings, five general rules apply:

(1) Use judgment in the selection of bearing size. If in doubt as to the proper bearings to use, consult our Engineering Department.

(2) Use care in mounting bearings. Keep them free from dust, metal chips, etc., before sealing them in the bearing heads.

(3) Provide properly machined seats for the bearings on the shafts, and in the bearing housings.

(4) Provide around the bearings, lubricant chambers of such capacity and design that they will retain the lubricant.

(5) Use a lubricant which is chemically neutral, SKF Grease recommended. Do not destroy the highly polished surfaces of the balls and ball races by the use of an inferior grade of lubricant.

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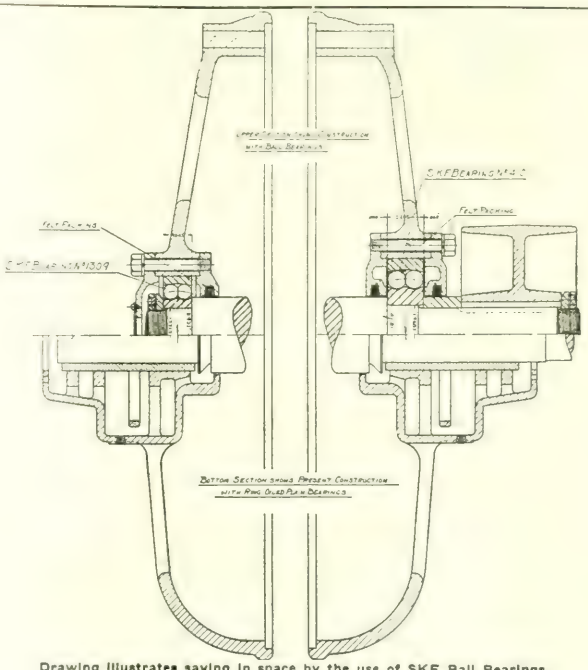
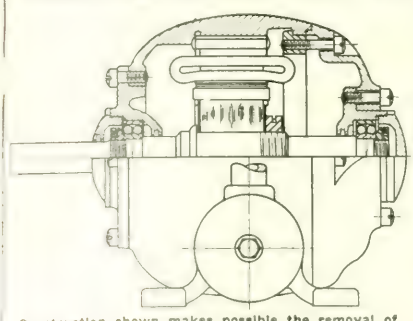
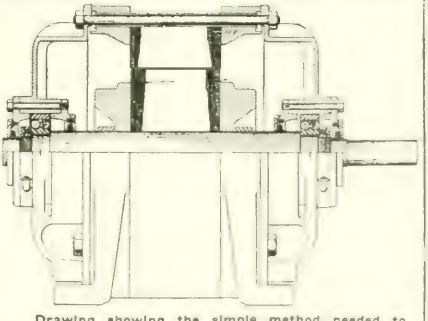

Felt Packing
SKF Bearing N° 1309
SKF Bearing N° 4 C
Felt Packing
Bottom Section shows Present Construction with Ring Oiled Plain Bearings

Drawing illustrates saving in space by the use of SKF Ball Bearings. Greater rigidity and freedom from vibration. Overall length of motor reduced 20 per cent.



Construction shown makes possible the removal of armature by simply taking out cap screws in bearing housings. The bearings remain on the shaft, and are not exposed to dirt.



Drawing showing the simple method needed to apply SKF Ball Bearings. No trouble from oil leakage. No change in air gap.

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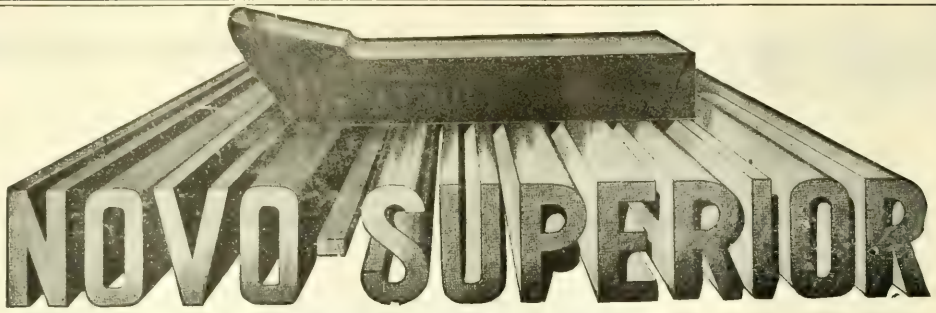

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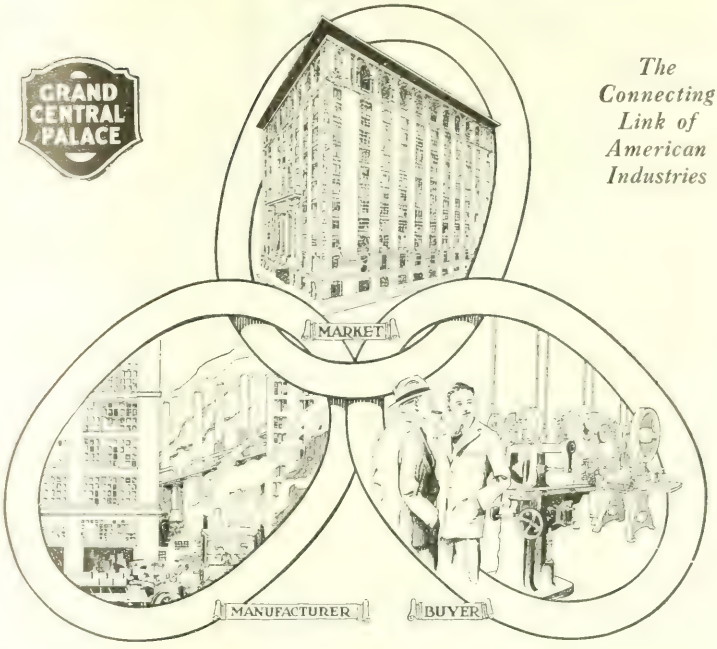

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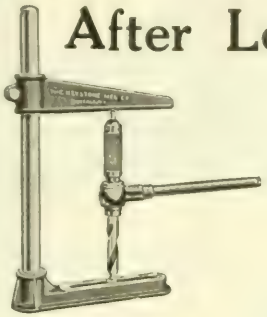

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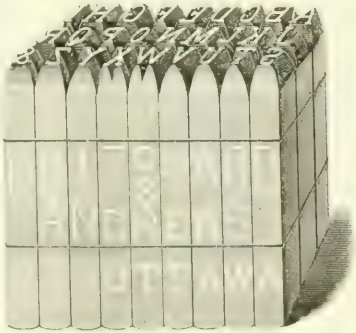

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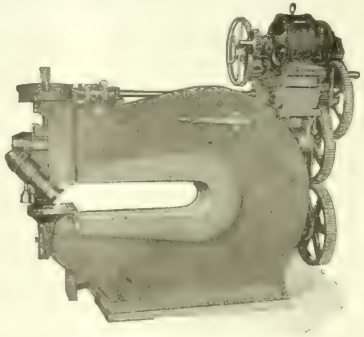

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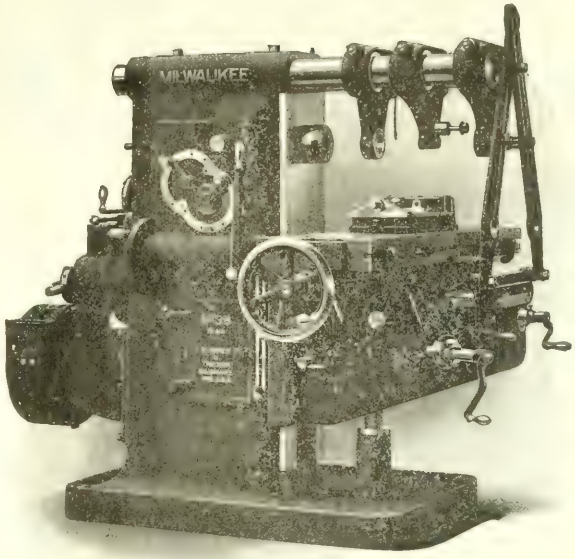

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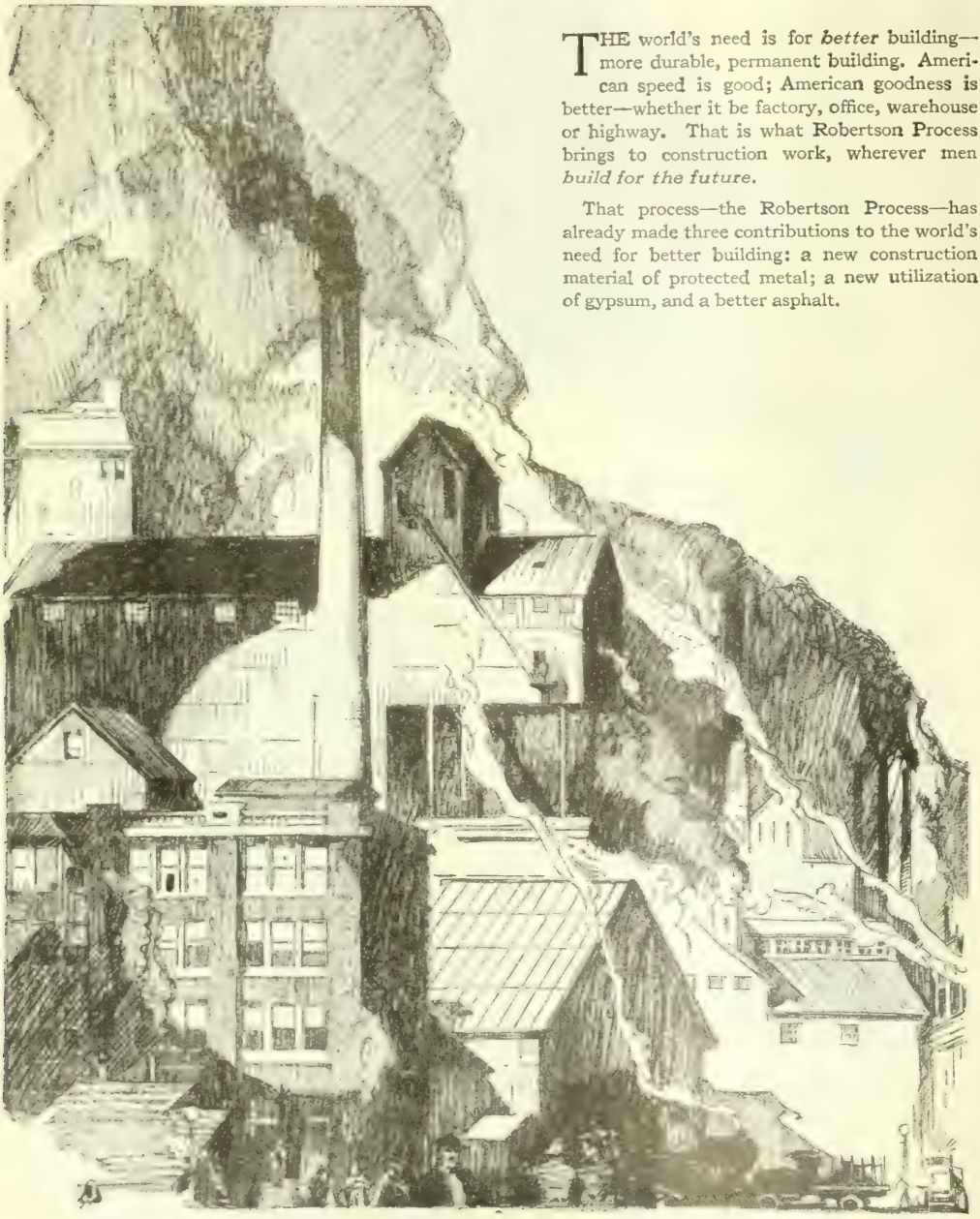

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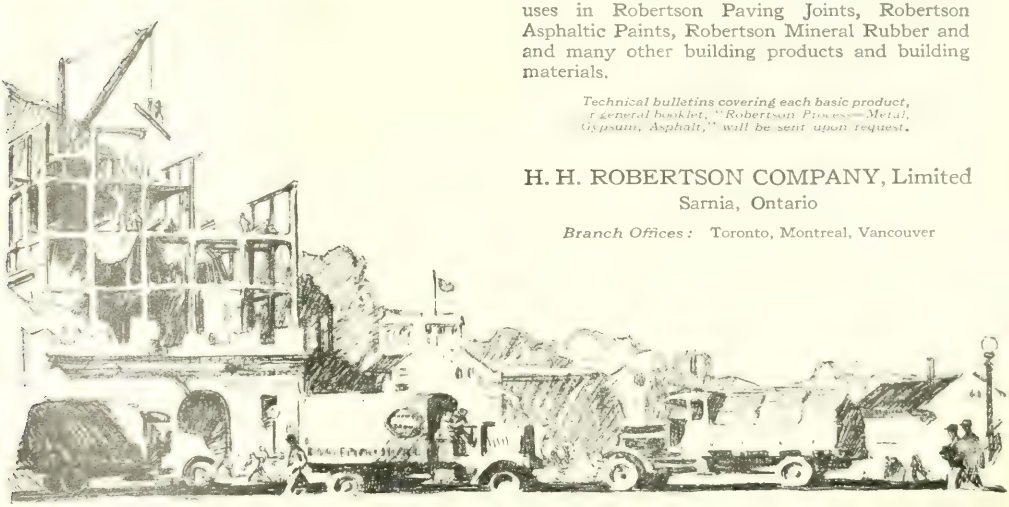

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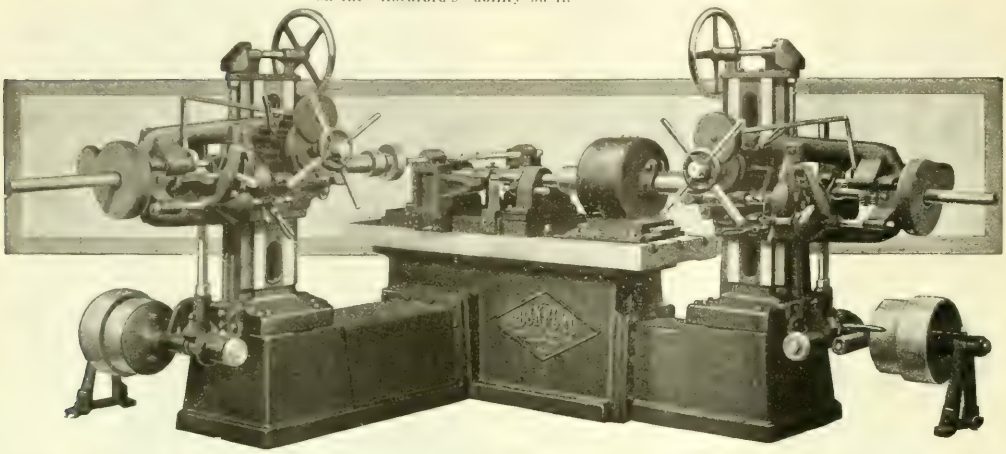

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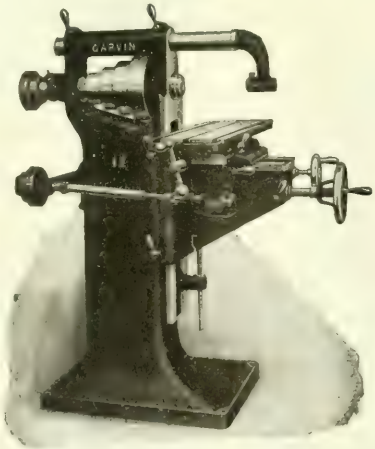

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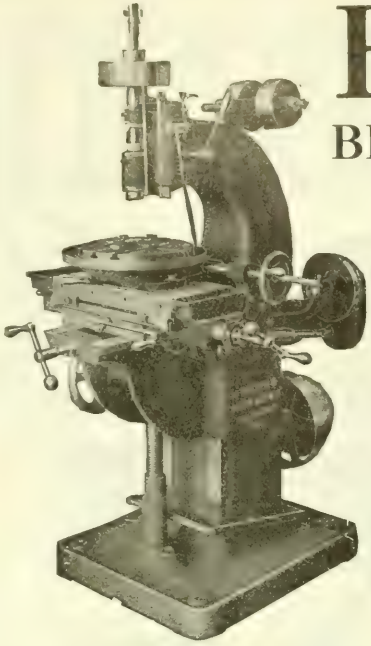

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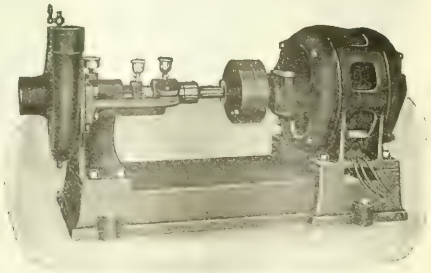

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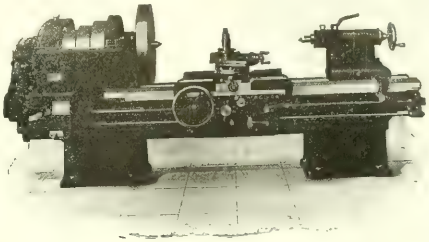

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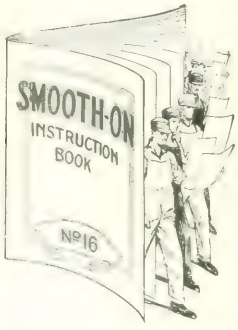

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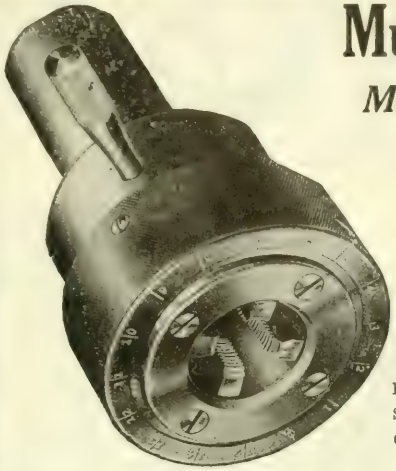

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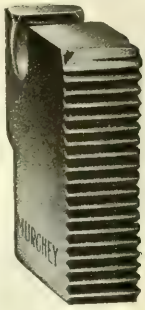

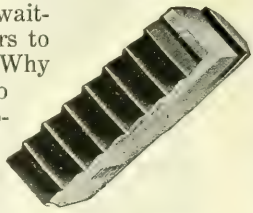

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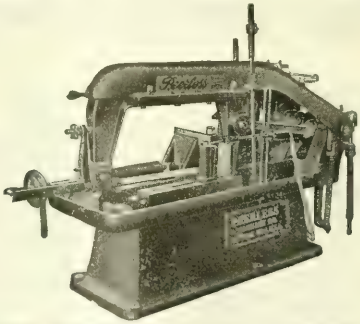

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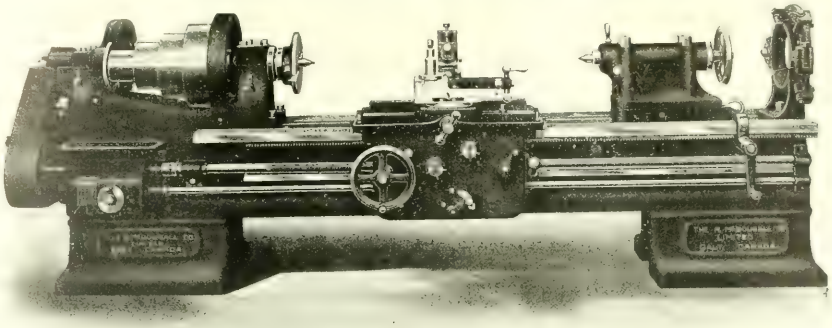

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"The Marshalltown Throatless Shears"

guarantees perfect work at less than half the ordinary expense.

Rotary, self-feeding shears designed for cutting in and out curves, straight or irregular shearing, circles, also beveling and splitting of plates. Built in various sizes having capacities from tin up to ½" thick. No limit to the size of sheet being cut. Hand, belt or motor drives. The last word in metal cutting shears. We also manufacture Rotary Bevel Shears, Splitting Shears and Plate Milling Machines.

Let us know your requirements.

Marshalltown Mfg. Co.
Marshalltown, Iowa
U. S. A.

If interested tear out this page and place with letters to be answered.

Note On Grinding

No. 56A

Steadyrest Work Shoes

Many times we are asked why we use hardened steel shoes in some cases and wood shoes in other cases. It may be helpful to explain at this time the reason for these different conditions.

Normally, in the production of commercially ground parts in large numbers, the work shoe must be of such shape, size and proportions as to remain a constant factor in the grinding operation, because the operator is constantly turning out piece after piece at short intervals. If he had to take into consideration variation in size due to change in the work shoe, his production would be cut down materially. Therefore, the hardened steel work shoe of the size of the finished work for finishing, and of the size of the rough ground work for roughing, provides a means of supporting the work and removing one of the variables in the grinding operation, because the hardened steel work shoe retains its size longer and can be depended upon to produce parts of the same size, piece after piece, without consideration on the part of the operator.

Where a machine is used for general all-round grinding, when there are seldom more than one-half dozen pieces to be ground at one given time, it would be manifestly unreasonable to hope to have hardened steel shoes of the proper size for all the various pieces being finished. Therefore, a steadyrest with adjustable wood shoes is provided which has a range within the capacity of the size of machine being used, and can be readily adjusted to the diameter of work being ground.

Much discussion has been met with in connection with the use of hardened steel shoes because, it is argued, the work being ground is liable to be scratched. This has proved to be a false line of reasoning, and it is readily understood when one considers that the steadyrest shoes of soft material will pick up particles of dirt, abrasive, chips, etc., and retain them, really converting the shoe into a lap; and consequently the hardened steel shoes will not become imbedded with these particles so easily. Therefore, if it fits the work properly and is in line with the work, hardened steel is less apt to scratch than the soft materials.

In the case of hardened steel shoes it is very important that they be properly constructed and properly mounted in the steadyrest. The shoe must present a considerable portion of its bearing surface to the work being ground. It must be in line with the axis of rotation of work, securely fastened in the steadyrest, and properly hardened and smooth.

The other forms of steadyrest do not need such careful attention as the hardened steel for, since they are soft by nature, they quickly wear to a point where they meet all of these conditions. The fact that the hardened steel shoes do **not** wear so rapidly is the reason why they must have more attention in the making.

NORTON COMPANY

Canadian Agents: The Canadian Fairbanks-Morse Co., Ltd., Montreal, Toronto, Ottawa, St. John, N.B., Winnipeg, Calgary, Saskatoon, Vancouver, Victoria. F. H. Andrews & Son, Quebec, Que.

Grinding Wheel Plants, Worcester, Mass.

Electric Furnace Plants		New York Store	Chicago Store
Niagara Falls, N.Y.	Chippawa, Ont.	151 Chambers St.	11 No. Jefferson St.

Detroit Store, 73-75 W. Congress St.

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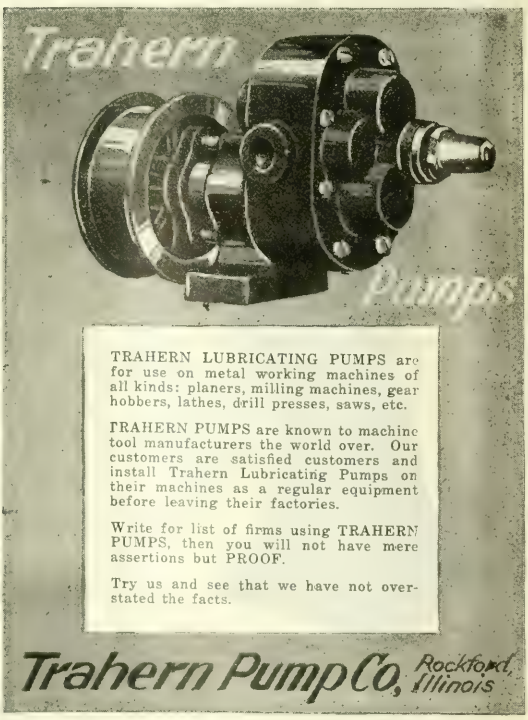
Mark your next order for steel lettering, dies or stamps—"Matthews Made."

Canadian Fairbanks-Morse Co., Limited

Montreal Toronto, St. John, Quebec, Ottawa, Hamilton Windsor, Winnipeg, Saskatoon, Calgary, Vancouver, Victoria

Jas. H. Matthews & Co. - Pittsburgh, Pa.

STEEL LETTERING DIES AND STAMPS



TRAHERN LUBRICATING PUMPS are for use on metal working machines of all kinds: planers, milling machines, gear hobbers, lathes, drill presses, saws, etc.

TRAHERN PUMPS are known to machine tool manufacturers the world over. Our customers are satisfied customers and install Trahern Lubricating Pumps on their machines as a regular equipment before leaving their factories.

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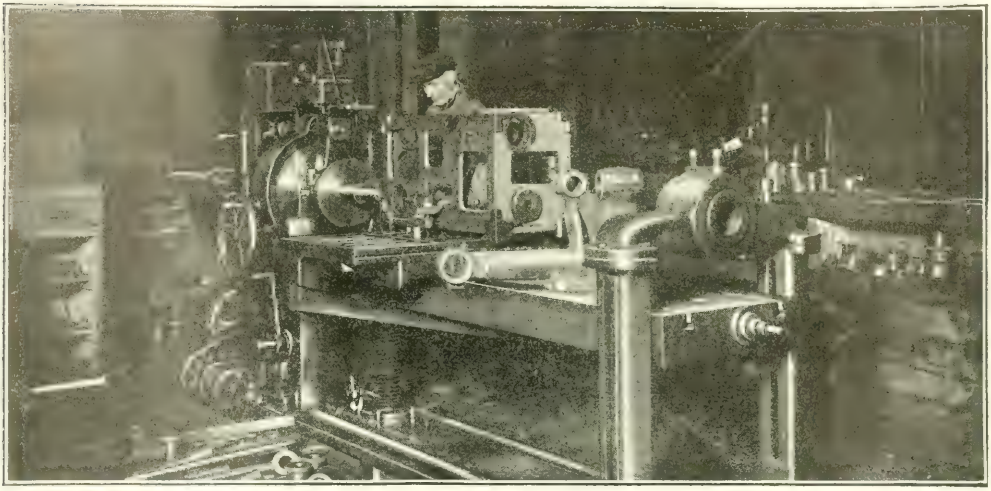
Trahern Pump Co. Rockford, Illinois

If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.

GISHOLT



METAL REMOVED
HAS A CASH VALUE

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Canadian Agents: The Canadian Fairbanks-Morse Co., Ltd., St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Saskatoon, Calgary, Vancouver, Victoria

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Windsor	Winnipeg	Saskatoon
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CANADIAN MACHINERY
AND
MANUFACTURING NEWS

Vol. XXI. No. 12. September 25, 1919

How Do You Prepare Your Shop Photographs?

The Value of Shop Photography is Already Too Well Known to Need Comment. The Preparation of Such Photographs is, However, an Important Point to be Considered

By F. A. McLEAN

PRACTICALLY every manufacturer of machinery, power plant equipment, or mechanical specialties today finds it necessary to occasionally have photos taken of his product, machine-tool equipment or plant, for advertising or reference purposes. In the United States there are many engraving and photographic concerns who make a specialty of this class of work, and fortunate indeed is the man who can secure the services of such concerns at moderate cost. Canadian firms doing this class of work are found only in the larger cities, and, as many of our largest Canadian manufacturing concerns are located in small towns, the cost of sending to the city for expert mechanical photographers is prohibitive in many cases and it becomes necessary to make the most of the means at hand.

In many shops it is customary to have the photos made by local photographers, and in this case it is necessary to give very clear instructions as to what you wish to have done, for it is well to remember that while most photographers are well educated and intelligent men, possessing more or less thorough knowledge of the technic of their craft, one cannot expect them to be advertising men and mechanical experts as well.

One large firm in the United States ran a contest to secure photos of their product—a device for use on planers, lathes, and milling machines—and although they spent several hundred dollars and secured many photographs, they were unable to use any of them, as none of the pictures secured brought out the merits of their appliance in the proper way. The method [illegible] was to send out a form letter to the users of their product, asking what their experience with it had been and asking such firms to have photos taken by a local photographer and charged to them, and, at the close of the contest, prizes would be awarded to those sending in the best pictures from an advertising point of view.

Many of the pictures which this concern received were splendid examples of the skill possessed by some of our small-town photographers, but practically none of them had been taken in such a way as to feature their specialty, and while they would doubtless have been of value to the makers of the various machine tools, the concern which should have reaped the benefit was out several hundred dollars with nothing to show for it.

Had this company gone into details and asked their customers to try and have the picture taken in such a way [illegible] would have [illegible]

PHOTOGRAPH TAKEN WITH MOVING WHITE SHEET IN BACKGROUND NOTE THE ABSENCE OF WRINKLES

advisable to have the majority of the pictures taken by one photographer. Firms which have all their photos made by the ordinary small-town professional photographer will find it better to place all their work with one studio than to farm it out where they can have it done the cheapest, as the more often you have a man take pictures for you, the more familiar he becomes with the requirements of your work and the nature of and variations in the light which prevails in your plant, and consequently is able to render better service and is more likely to give you a higher grade of work and get it out quicker than when he knows that probably your next job is going to his competitor on the other side of the street.

If the photographer you employ does a considerable amount of amateur work, it will be a good plan to make it plain to him that your work must have special attention and care, for which you are willing to pay, rather than have it thrown into large tanks with a lot of amateur work, to be gotten out on a speed, rather than a quality basis. Should you require about the same amount of work in winter as in summer, it should not be hard to bring him to your point of view, as, during the winter time, a good deal of the amateur work slacks off and he will be more dependent on your work than in the summer time.

It is sometimes impossible to get a professional photographer to come to your plant when he is needed most, and if pictures are required frequently it will pay any concern to train one of their own staff to do some of this work. With the almost universal interest in amateur

photography at the present time, it should not be hard to discover amongst the employees of the draughting room or shop a man having some of the necessary qualifications for this work.

The Proper Camera to Use

Having secured a man to do the work, the next thing to consider is the camera, which should be either of the film or plate type, but preferably the latter, as films do not give as good a negative as plates for this class of work, and are not as easily handled should it be necessary to paint out some portions of the negative for any reason. Plates are less susceptible to temperature changes than films, but are more easily broken, and for this reason they should be kept in a vault when possible. It is a good plan to number each negative with India ink near one of the edges, and place them in envelopes on which is also written the date, number and title of the negative. Dates, numbers, titles and sizes of the negatives, should then be entered in a book or card index record.

The size of the camera to be used will depend on the average size of the objects to be photographed, the amount of detail required, etc. For the average shop a 5 x 7 or 8 x 10 will probably be the most suitable, as the cost of plates and prints for the 10 x 12 and larger sizes is high, and pictures made with cameras below 5 x 7 seldom contain sufficient detail to bring out the desirable points of a machine or mechanical device clearly. Retouching a 5 x 7 view of an object containing much detail is usually expensive and unsatisfactory. For such the 8 x 10 size is best.

The ground glass screen with which these cameras are fitted allows the object which is being photographed to be brought into much sharper focus than is possible with cameras equipped with finders alone, and this has a good deal to do with the ultimate quality of the picture obtained. The focus should be adjustable by a rack and pinion and the camera should have a rising and falling front to prevent distortion when photographing high buildings, towers, structural steel work, etc.

A well-constructed, rigid tripod, should be purchased with the camera, as a poorly-constructed tripod will often allow the camera to move when inserting plate-holders, withdrawing or replacing plate-holder-slides, etc., causing blurred negatives.

Before deciding on the type of lens to be used, it is well to obtain the advice of a reliable manufacturer of photographic apparatus, informing him just what you wish to do with the camera and relying on his advice in choosing the lens you will use. The old reliable rapid rectilinear lens will turn out some very satisfactory pictures, but some of the more modern types are much quicker and better adapted to operating in poor light.

If floor space is available and conditions warrant it a small dark room may be constructed and the pictures developed and printed on the premises, but unless a comparatively large number of prints are to be made it will probably be better to have this work done by a nearby professional photographer, who will unload and develop the plates, make the prints, and reload the plate holders.

Some firms build machinery for which the demand is too small to warrant the expense of having half-tones made for use in the publication of descriptive literature and when this is the case photographic prints or blue prints made from the negatives will be useful. A number of prints of this nature may be mounted on sheets (with little stickers called Art Corners) with neatly lettered descriptive captions under each print, and the whole bound into a book for the use of the sales force. Small booklets may be gotten up in a somewhat similar manner, using mimeographed sheets interleaved between the prints to carry the sales message or description of the product.

Photos of Set-Ups

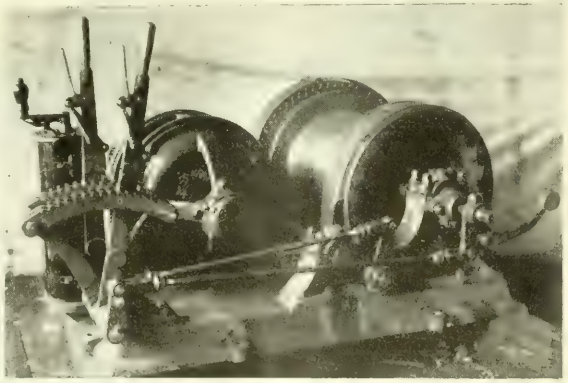
Photos of the tooling set-ups for certain jobs will often be found of value to a mechanic who is called upon to handle a certain job for the first time, and it is also useful at times to have photos made of the assembly of special machines which are being made for the first time and for which there is some likelihood of having repeat orders. These photos will save considerable time if for any reason the men who assembled the first machine are not available.

In the production of half-tone engravings, the cost of retouching is usually one of the largest items, and any method which will eliminate some of this cost by reducing the amount of retouching required is well worth application. It is often possible to do away with some of the retouching required by properly preparing the machine before having the photos taken. One of the first points to be considered is the painting of the machines which are to be reproduced; if they are painted a very light color and a light background is used, the outlines of the machine will be hard to distinguish from the background, and will require retouching to make them stand out properly, and if a very dark paint is used and the background is naturally dark, a considerable amount of detail will be lost and will have to be painted in before a good half-tone can be produced. In either case the retouching will be difficult and expensive. Even with a comparatively light background in the rear of the machine many small parts of the subject which have as their background the main body of the machine will not come out clearly if the machine is painted a very dark color. Dark slate-colored paint, made from white lead and lamp black and mixed so as to dry without gloss is the most satisfactory. Some painters add blue, but this is misleading and has the effect of lightening the tint in the photograph.

When taking photos of machinery in the average shop it is customary to place a sheet of white cloth behind the object being photographed in order to cut out some of the extraneous light and to provide a light background against which the outline of the object being photographed will appear in strong relief. After this sheet has been used a few times it becomes very dirty or spotted, and as these spots sometimes show in the finished print they have to be painted out in order to prevent them showing in the engraving.

If this sheet is large enough to clear the range of the lens on each side of the camera and it is kept in constant motion while the exposure is taking place, it will be found that the print will be sharper and the dark spots and wrinkles which had very often to be painted out when the cloth was held stationary have entirely disappeared.

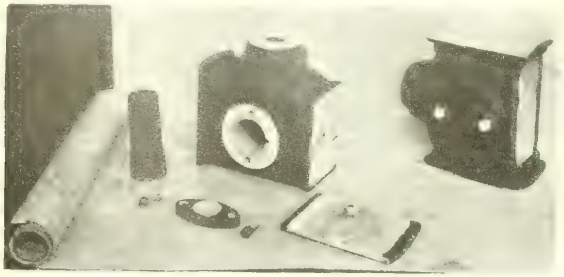
When the machine rests on a dark floor it is a good plan to spread sheets of white paper on the floor around its base to lighten the background and reflect the light. Sometimes sheets of paper are not readily obtainable, and in this case flour, sawdust, or shavings will accomplish much the same result, although the latter will require some painting out.



PHOTOGRAPH TAKEN WITH STATIONARY WHITE SHEET IN BACKGROUND. NOTE THE WRINKLES AND DIFFERENCE FROM THE ONE ON PRECEDING PAGE.

Watch These Points

When it is desired to have shop screws, nuts and bolts, or letters on a casting, etc., show up strongly, they should be rubbed with chalk or coated with a thin covering of white lead. Lettering figures, etc., may be painted in white on the machine, as is done by many makers of tanks and steel plate work, and will show up very well. Where a number or descriptive matter is to appear in an engraving it may either be cut into the finished plate by the engraver or painted on the photo by the retoucher. A scheme used by at least one large Canadian maker of machinery is to have a small board on which is painted the name of the machine, firm, or any other matter desired, and this board is placed near or against the machine being photographed in such a way that the lettering will appear clearly in the finished print. This method is particularly adapted for making up sets of photographs or blue prints for sales purposes, or draughting room use.



THE DANGER OF MAKING CERTAIN SURFACES TOO LIGHT IN COLOR NOTE THE FACT THAT SOME SURFACES ALMOST MATCH WITH THE WHITE BACKGROUND. THIS IS AN OBJECTIONABLE FEATURE.

It is sometimes desirable to take a picture of a machine or device in operation for advertising purposes, and here the shop photographer has advantages over the commercial studio as he is not liable to picture a man wearing a silk hat at work on a lathe, or some other equally ludicrous combination which one sometimes sees in the efforts of some advertisers to secure atmosphere for their advertisements. One point which should be watched, however, is the pose of the machine runners, riveters, miners, or whatever they may be, as it is one of the failings of mankind from childhood to try to appear at their best when having a picture taken, and unless this posing is carefully watched some very unnatural pictures will be the result. Many men will want to look at the photographer or camera instead of at the machine they are running, or at the work they are supposed to be doing, or they will assume a rigid position when they should be relaxed, etc. It is sometimes possible to get a picture of a man at a machine in operation without the operator knowing that it is being done, and, while there is always danger of the man moving and spoiling the picture, it is sometimes possible to secure a position in this way which cannot be obtained in any other. Occasionally it is possible to fool the subject by [illegible] to take the picture, leaving the actual exposure to a more favorable moment.

The illustrations used in the Norton grinding machine advertisements are one of the best examples of what may be done in the way of securing good pictures of machine tools in use.

Retouched photos may be filed in folders having a proof of the cut pasted to them and placed in vertical filing cases for storage. A simple numbering method may be arranged by numbering the pages of a blank book from 1 to 1,000 or as high as required, entering the description of the first photo taken with its size, number of prints, size and number of half-tone and electrotype made from it, and where the photo and cuts are kept, etc., on the first page. This scheme may be varied to suit different conditions.

Illustration for part lists, etc., can be made by fastening the parts to a board covered with light-colored paper, on which is marked under each part, its serial number, or these may be painted on the photo when it is retouched. Care should be taken to see that the parts are so distributed that they will not interfere with each other and that one piece does not rob its neighbor of the light necessary to make it show up properly.

In taking pictures in the shop, it will generally be found better to use the smallest stops on the camera with correspondingly longer exposures than those required for the larger openings, as the pictures with the smaller stops will [illegible] sharper.

Study the Details

Care should be taken when arranging machinery which is to be photographed that all small parts such as oil cups, pipe fittings, etc., are properly screwed in place, as any misalignment in these small details looks very bad in the finished engraving. In one case of this kind which came under my observation, a large globe valve was not screwed on straight, and this point was not noticed until half a million had been made and work started on a catalogue in which this half-tone was used. When the printer sent back the first proof this defect came to light, and the engraving had to be held up while the corrected photo was sent to the engravers to have this defect rectified, [illegible] plates made, at an additional outlay, whereas, had a little attention been paid to this point in the first place everything would have been all right.

Sometimes oil holes or threaded openings in some classes of machinery are plugged with corks or wooden plugs to protect the machine from dirt and moisture during shipment, and where this is the custom the shop photographer should be cautioned against forgetting to withdraw these plugs before making the exposure, as otherwise they will have to be painted out on the print and sometimes threads or other matter painted in. The cleaner the shop is at the time the pictures are taken the better, and when views of a number of small machines are to be taken, they should be arranged in neat rows when possible as they will look better than when scattered around any old way.

Generally speaking, the object to be photographed should be lighted from the upper left-hand, but in a crowded shop and with large machines, it is seldom possible to arrange this as it should be and all that can be done is to choose that time of day when the light will be most favorable, avoiding as much as possible having the camera face strong light from shop windows, overhead monitor or saw-tooth roof of if this cannot be avoided the light should be blocked off by sheets of cloth or paper if time will permit.

Considerable judgment may be exercised in the choice of the point of view, especially when photographing large machines, selecting such locations as will show the greatest number of important features and avoiding positions which will result in an unbalanced or distorted effect. Correct judgment or good taste in this respect is generally the result of experience, and no general rule can be laid down. As an instance of what is meant, it is best to photograph cross compound engines or compressors from the high pressure side. If taken from the low pressure the difference in cylinder diameters is exaggerated and the effect is unsatisfactory. It is always safe to check the finished machine over before exposure and see that all parts have been assembled, that all operating levers, etc., are in correct position, and if necessary have the machine turned over until all moving parts are in the most effective position as regards appearance.

The application of commercial photography in the machine tool and manufacturing industries is too large a subject to be fully covered in a short article of this kind, but if a little attention is given to the foregoing suggestions it will be possible to secure some very good pictures at a reasonable cost.

The second course of the table d'hote was being served. "What is this leathery stuff?" demanded the diner. "That, sir, is filet of sole," replied the waiter. "Take it away," said the diner, "and see if you can't get me a nice tender piece from the upper part of the boot, with the buttons removed."—San Francisco Argonaut.

Plant of the Hull Iron and Steel Foundries

A COMPREHENSIVE story of the business from its inception up to the present, including the system of recording and cost keeping.

By F.H.B.

BIRD'S-EYE VIEW OF THE "HISCO" PLANT OF THE H. I. & S. FDY.

THE Hull Iron and Steel Foundries, Limited, whose works are shown in the accompanying illustration, is an establishment of which its promoters and founders are justly proud. As its name would imply, it is essentially a foundry, although a machine shop of no mean proportions accompanies it. As its name also implies, its products are both of iron and of steel, although the steel predominates.

Grey iron foundries are not an uncommon part of the make-up of most every industrial centre, and the grey iron department of this plant is practically a duplicate of other foundries which are equipped for doing heavy work. The melting capacity of this department runs into tons and the equipment consists of enormous cupolas and ponderous cranes. With the foundry specially equipped, as it is for doing large work, they have no particular advantages in the way of doing small castings, and do not cater to that trade, but for such castings as fit their capacity they take second place to none, and are prepared to fill orders for grey iron castings of very large dimensions.

The Steel Foundry

It is to the steel foundry branch of the plant, however, that we will pay particular attention on this occasion. Although not built for a munition plant or in any way as a war-time necessity, it appeared on the steel producing horizon at a most opportune time and did much toward deciding the issue and winning the goal toward which all were struggling.

In the year 1913, when times were not any too good in any line of business, when in fact many industries were working with very reduced staffs and hundreds of workmen were in idleness, Mr. A. H. Coplan, of Ottawa, with a keen eye to business, saw an opening for just such a business as this, and with characteristic determination and enterprise succeeded in completing the structure and getting it in first-class running order at just about the time of the beginning of hostilities. The war did not bring much business to Canada at first, but on the contrary, it added to the depression; however, in no time it was found necessary to call upon Canada for supplies other than foodstuffs and while our machine shops were found to be of inestimable value in the production of shells, etc., the foundries, particularly the steel foundries, were also called upon to produce enormous tonnage of steel castings, with the result that the Hull Iron and Steel Foundries found themselves very busy and getting busier. In fact, it was found necessary to strain

MODERN STEEL FOUNDRY PRACTICE HAS BEEN SO PERFECTED THAT TOP POURING CAN BE DONE SUCCESSFULLY ON MANY LINES OF WORK.

every muscle in order to meet demand for castings, and many additions were added to the plant as a consequence.

Now that the war is over and the country is calling for such lines as were neglected for so many years, the experience gained during the war, particularly in making goods which would pass the rigid examination of the munition board and also in producing the maximum output in the shortest possible time, places them in an enviable position for filling large orders, particularly of large castings, on surprisingly short notice.

It must not be inferred from this, however, that the experience gained during the war is all they have to fall back upon. The company was very fortunate in securing the services of Mr. A. Baillot as foundry superintendent. Mr. Baillot is a thorough master of the steel foundry business, having had exceptionally wide experience in Belgium and France, especially in Paris, France, and this, along with the experience of the last six years, places them where they are to-day.

Unlike many plants of the mushroom order, which sprung up as it were during the night in order to do munition work, and which suspended operations as suddenly as they began on the conclusion of peace, the Hull Iron and Steel Company never even slacked down, but on the contrary are busier than ever and are at present making extensive additions.

Present Capacity

The present capacity of the foundry is 600 tons per month, and the equipment consists of electric as well as open-hearth furnaces, ordinary foundry cupolas and Trapman Converters. They are also well provided with annealing furnaces and drying ovens, in addition to special equipment for heat-treating manganese steel castings.

Special Features

A unique feature of this plant is that they can produce practically all of their own raw material. With the aid of the electric furnace steel turnings make ideal raw material, while wrought or even cast turnings can be used if so desired. It has also been demonstrated that first-class metal can be produced direct from the crude iron ore. Of course, none of the metal procured from any of these sources is poured into steel castings. This metal is poured into pigs, after which it is tested and analyzed for carbon, silicon, sulphur, phosphorus, etc., and graded accordingly.

Moulding Equipment

In the moulding [illegible] equipment includes pu[illegible] machines for work up to fifteen feet in diameter and electric cranes capable of handling castings of this size, in addition to the regular run of foundry requisites. Another interesting operation for which they are well equipped is that of heating and compressing certain castings in order to make the grain more dense and sound.

Sure of Quality

Steel castings are not ordered in the manner so commonly in vogue in grey iron foundries, where the principal requisite is that they be soft. Steel castings are ordered to be made to specified chemical content as well as physical strength, and from every batch of metal used test bars are poured which are analyzed by a competent analyst, and physical test taken on powerful testing scales. The company has both the physical testing apparatus and complete testing laboratory of their own in charge of F. H. Young, a practical chemist and metallurgist. A view of the laboratory is shown in the accompanying illustration.

Additions Under Way

At the present time two additional buildings of large dimensions are under construction along with some smaller ones. One is a complete two-storey pattern department remote from the main building, with five bays downstairs and six upstairs. These bays are separated from each other by automatic fire-proof doors, in fact, the entire building is to be as near fire-proof as man's ingenuity can devise. One large bay is to be equipped with machinery and tools for doing pattern work, while the remaining ten will be for pattern storage purposes. The other building will be a modern machine shop equipped with tools for keeping the shop equipment in order, and also for machining such castings as have to be machined before shipment. Many of the castings turned out of this foundry are of such proportions that few machine shops could handle them. Among the tools in the present machine shop might be mentioned a boring and turning mill capable of handling work 75 feet in diameter, and other machines of equally large proportions.

Undoubtedly the grandest feature of the entire business is its "system." System is certainly the keynote of success, and system has certainly played its part in the successful upbuilding of this business.

Calculating Recorder

Probably the most interesting feature of the entire "system" is the Bishop Electric Calculating Recorder, by which the actual cost of producing a job is recorded in the office by the workmen in the shop. To describe this in detail would be a greater undertaking than an article of this kind calls for, but it will be interesting to note that every pattern which is brought to the shop is registered and given a number. This pattern is placed in the pattern vault and its location is registered. When any pattern is wanted, it can be located instantly. When the pattern is given to a moulder, he does not have to leave his floor in order to register the minute he began work on it and when he finished it, by a simple movement on his part, he lets the office know what pattern is being moulded, who is moulding it, and how long he took to mould it. So complete is the system of recording that it is quite possible in answering a long distance call to tell at once just how any [illegible] progressing, which jobs are being [illegible] many are completed, and how many are being done per day.

TESTING [illegible] LIMITED

The output of this business consists of locomotive wheels, bridge work, crane castings, railroad contracts, in fact, all kinds of steel castings of whatever chemical content is required.

Mr. A. H. Coplan, the founder of the business, is president and general manager, and Mr. F. H. Cross is assistant manager.

DON'T TINKER WITH ECONOMIC PRINCIPLES

Lowering the standard of living by artificial methods makes for popularity, but this course ignores economic principles, thus setting aside temporarily the law of supply and demand. But, back of all is that economic law which grows out of the experience of years and which, in the end, will prevail. Governments, and more especially those recently engaged in war, have borrowed heavily under inflated conditions. It would seem unreasonable to expect that there would be any attempt to meet the interest obligations on such indebtedness contracted under inflated conditions out of taxes to be raised under a deflated condition.

Such being the case, it would appear to be sound business to expect the Governments to refrain from any drastic measures to bring about a general widespread deflation until the public debt had been cared for in permanent form on a basis where the revenues from direct taxation under a moderate revenue law would be ample to meet the interest charges and provide the necessary sinking fund.—Continental and Chemical National Bank, Chicago.

EXCHANGE NO FACTOR IN BASIS OF TARIFF

Ottawa.—The Customs Department has had many requests from importers that, in view of the fact that the British pound sterling has heavily declined, this should be taken into consideration when Canadian importers pay customs duties on imports from Great Britain. The practice is that they pay on the par value of $4.66. They believe that they should be given the benefit of current exchange.

The Customs Department points out that the practice is fixed. The matter of exchange is not taken into consideration as the value of the pound sterling is fixed by the Currency Act of Canada as compared with the dollar. Officials claim there is no injustice to the importer, as the goods he imports are worth at the rate of $4.86 2-3 in Great Britain, and under the customs law goods are valued at the time and place whence they are shipped direct to Canada. The importer gets sufficient advantage in the favorable rate of exchange.

The matter has been up for consideration several times. The practice is the same in the United States, the valuation for customs purposes there being $4.86 2-3, as here. The department has refused to entertain all requests to accept payment at the exchange rate.—T.M.S.

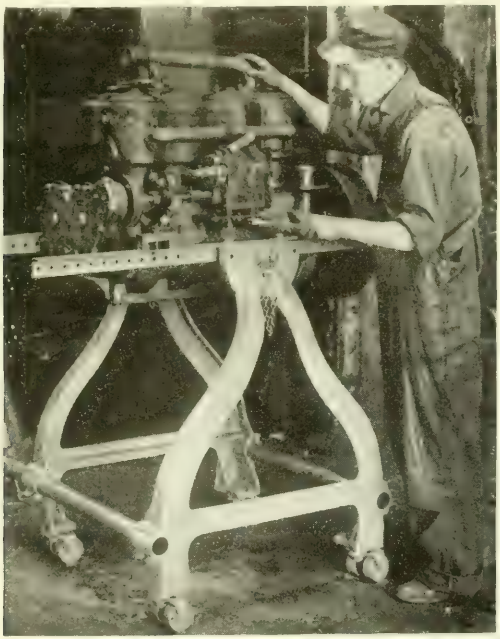
A Novel Gasoline Motor-Assembly Stand

By FRANK C. PERKINS

THE accompanying illustration shows a novel gasoline motor stand developed at Knightstown, Indiana.

It is held that this motor stand will handle any motor from that in the smallest passenger car to the largest truck and tractor motor. It is instantly adjustable to any width from 0 to 30 in., and in height from 32¼ in. to 39¾ in. The motor is placed in the stand in the natural way—the same way that it is placed in the car.

The side rails of the stand compare to the frame or sub-frame of the car.



VIEW OF THE STAND IN USE.

After the motor has been clamped in the stand it can be turned to any desired position and locked there by means of a small steel pin. This pin is attached to the stand by a chain and cannot be lost. The motor can be completely inverted so the lower crank-case may be readily removed, and the bearings exposed in such position as to be very easy to get at, and bearings may be scraped in and rods lined up with ease.

It is maintained that in motor assembly this stand meets every requirement, with no obstructions to the mechanic. All parts of the motor may be reached with the minimum amount of waste effort. In progressive or individual assembly, after the crank-case has been fastened to the stand it is not changed until the motor is ready to be removed. It is portable and is particularly adapted to speed up the work and keep all men busy.

A Ford attachment was designed to facilitate the assembly and repair of the Ford motor, the peculiar construction of which makes it impossible to handle this work in the same manner as the ordinary type of motor. This attachment securely clamps the cylinder block to the motor stand in such position that the Ford crank-case, transmission, crankshaft, flywheel, magneto, connecting rods, pistons and cylinder head can be removed without rearranging the cylinder block in the stand. This makes it possible to tear down a Ford motor and leave only the cylinder block in the stand, as is shown in the lower illustration.

These stands are regularly equipped with double wheel castors which enable the stand to be moved from place to place with ease. In motor assembly the crank-case may be clamped to the stand and all parts of the engine assembled in the motor room. The stand, with the completed motor, may then be taken to the chassis department, where the motor is removed and placed in the chassis, and the stand is ready for another motor. In repair the motor can be removed from the car and be immediately placed in the stand, after which it can be removed to the motor room for repairs, and when ready to install again the motor stand conveys it back without removing the motor from the stand.

A man from the north of Scotland was on a holiday in Glasgow. On Sunday evening he was walking along Argyll Street when he came upon a contingent of the Salvation Army, and a collection-bag was thrust in front of his nose. He dropped a penny into it.

Turning up Queen Street, he encountered another contingent of the Salvation Army, and again a smiling "lass" held a collection bag in front of him.

"Na, na!" he said. "I gied a penny tae a squad o' your folk roon' the corner jist the noo."

"Really?" said the lass. "That was very good of you. But, then, you can't do a good thing too often. And besides, you know the Lord will repay you a hundredfold."

"Aweel," said the cautious Scot, "we'll jist wait till the first transaction's feenished before we start the second."—Tit-Bits.

IT WAS TIME

A preacher at the close of his sermon said: "Let all in the house who are paying their debts stand up." Presently every man, woman and child, with one exception, rose to his feet.

The preacher seated them and said: "Now every man not paying his debts stand up." The exception, a careworn, hungry-looking individual, clothed in his past summer's suit, slowly assumed a perpendicular position.

"How is it, my friend," asked the minister, "you are the only man not able to meet his obligations?"

"I run a newspaper," he answered, "and the brethren here who stood up are my subscribers, and—"

"Let us pray," exclaimed the minister. —Exchange.

Did you ever realize that every time you grumble you are making connection with the grumbling currents from other grumblers; that every time you find fault or scold or nag, that every time you show a mean, nasty disposition, you are making connection with vibrations from others along the same line?—"Success" Magazine.

Holding Devices Used on Jigs and Fixtures

BY ROBERT MAWSON

ALMOST every modern machine shop uses some jigs or fixtures to obtain intensive and interchangeable parts for manufacturing.

In the larger plants a special department is maintained, where these special tools are designed. Under such conditions some system may be followed when designing the details which are used in the tools.

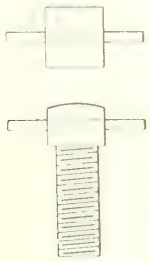


FIG. 1.

However, in the smaller shops, where only a comparatively limited number of jigs and fixtures are used, the work of designing is carried out either by one of the machine designers or draftsmen, or more often, by the tool room foreman, or one of the tool makers.

Under these latter conditions very little thought is given, as a rule, to provide tools according to any system of interchangeability of details. It will sometimes be found that on a fixture or jig the various bolts or screws are made of different sizes. This means, of course, nuts of different sizes, and the consequence is that the operator of the tool must use a number of wrenches when tightening the fastenings to hold the piece being machined in the tool.

This entails a loss of time, for the bolts should, whenever possible, be the same size so that only one wrench is necessary.

It is, however, advisable to avoid the use of any wrench, as under such conditions the tool is made quicker acting.

One method by which this can be done, and which is often used is to make the screw with a head, of larger diameter than the body of the screw, whenever possible, and having the periphery of the head knurled, the disadvantage of this holding device (which is at best unsatisfactory to use) is because when the man's hands are greasy, which is usually the case, sufficient pressure cannot be brought to bear on the screw and also by frequent use the fingers of the operator become sore by reason of the knurled surface.

One way to [illegible] is afforded by making holding screws as shown in Fig. 1.

This is a very simple medium, being a standard or stock screw, either square or hexagonal head, with a pin forced into the head as illustrated.

This method overcomes the objection of using a wrench, but it is found that it is also hard on the operator's hands, the small pins being uncomfortable to the man when used frequently. The device shown in Fig. 2 was designed to meet the demand and it has been found to "fill the bill."

These knobs are made of malleable iron castings to provide strength and also cheapness, and as illustrated, are made with four wings formed on an arc and terminating into a boss at the rear.

The wings afford a convenient and easy hold for the hand so that the man can exert suitable pressure for any desired case.

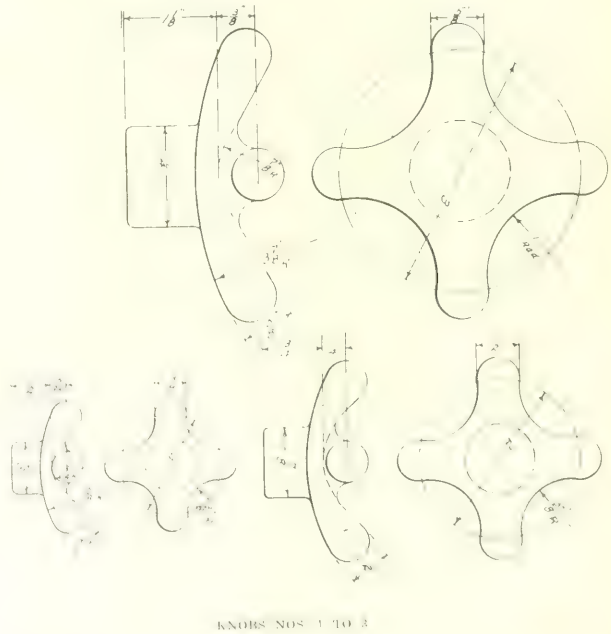
A hole can be machined in the boss so that a turned portion of the screw can be forced into it and held by a pin placed at right angles. The screw is then integral with the knob and can be used in a manner similar to a bolt, or [illegible] if desired and used as a nut on a threaded stud. The knobs are made in three sizes, and the dimensions given.

With these sizes the knobs are applicable to all types of jigs or fixtures, from the smallest to the largest.

A further advantage may also be noted. Namely, that these elements being carried on hand in the tool room, enables the fastening screws to be made much cheaper as it is only necessary to chase a straight piece of steel for the thread and turn down the end to suit the hole machined in the knob.

This is much cheaper than turning, threading and knurling a large diameter of steel to make a knurled head pin or screw. We have found such success with the device, both cheapness, quickness and satisfaction to the operator that they are now being used on all our special tools, superseding all other types of holding screws.

The number of the knob, either 1, 2 or 3, is usually cast on top of the casting, so that when calling for one on a design it is only necessary to mark on drawing say "knob No. 3," and the tool maker knows what is required and asks for it from stock.



KNOBS NOS. 1 TO 3

The Strength of Screws, Bolts and Nuts

In His Memorandum to the Manchester Steam Users' Association the Author Gives Some Interesting Data Regarding These Much Discussed Items of Mechanical Design

By C. E. STROMEYER

IN my last year's Memorandum I mentioned that this subject was receiving consideration, but, with the exception of a few failures, which have occurred in the meantime, no practical enquiry into this subject had been carried out. The subject was dealt with in a paper read at the Spring Meeting of the Institution of Naval Architects. It was there shown that very slight irregularities in the shapes of screw threads, and more particularly in the relative pitches of screwed bolts and nuts, could produce very serious local stresses at the roots of the threads, stresses which were found to be far more intense than the overall tension stresses in the core of the bolt. It was also found that the finer the threads the intenser the local stresses, and that, contrary to the generally accepted view, a bolt with a fine thread and, therefore, with a relatively large core is no stronger than a bolt with a coarse thread. In fact, this conclusion is almost self-evident, if, as an extreme case, we look on the bolt head as being a nut with microscopically fine threads welded together in order that they may not become disengaged. Of course the corner between the bolt and the imaginary nut would be a mathematically sharp one, and, as is well known, a sharp corner is very weak because, as would happen if a microscopic thread had actually been used, all the shearing stress is concentrated close to the corner. It follows that a bolt with a microscopically fine thread is a very weak structure. The other extreme case is a bolt with such deep threads that it has no core, a mere cork-screw. Such a bolt would also have very little strength; but there is some intermediate ratio of depth of thread to diameter of bolt for which the strength is a maximum.

Unfortunately, this maximum has a comparatively low value, being about one-third of the strength of the shank of the bolt measured over the threads. This, no doubt, accounts for the comparatively low stresses which are allowed in bolts. For instance, the permissible stresses on boiler shell plates between the rivet holes reaches 13,000 lbs. per square inch, and still leaves an ample margin of safety, whereas 10,000 lbs. on the cores of bolts, or about 7,500 on the shank of a bolt is considered fairly high. In reality the local stresses at the roots of the threads, combined with the longitudinal pull of 10 000 in the core, works out at about 20,000 lbs. per square inch, and it is probably only due to bolt materials being very plastic, and the threads being very small structures and, therefore, capable of adjusting themselves, that nominal stresses of 10,000 lbs. corresponding to actual local stresses of 20,000 lbs. do not result in failures.

These local stresses can be greatly intensified by making the pitch of the nut finer than that of the bolt and this malpractice is a not uncommon one. Most bolts have their threads cut with dies, and when these get blunt they tend to lengthen the bolts while they are cutting and compressing them. Then also large bolts and nuts are turned in lathes, and when these have seen much service, the leading screw has become more severely worn near the headstock where the nut would be turned than further off where the bolt thread would be turned. The result seems to be that many large nuts have finer threads than their bolts. The result is that when these bolts are loaded, it is only the threads near the lower end of the nuts which carry the load, and the severe resulting local stresses combining with the longitudinal pull, which is also a maximum at this level, produce very severe stresses; so intense indeed that no simpler means for breaking off a bolt end could be devised than using a hard steel nut with a relatively fine thread and wrenching off the bolt end.

Conversely a very marked reduction in the stresses near the lower level of the nut can be effected by making the nut thread of a slightly coarser pitch, say one-tenth per cent., than that of the bolt. When the nut is screwed on and a pull applied, the bolt will at first rest only on the upper threads of the nut, and gradually, as the load is increased, the bolt lengthens and more and more threads become engaged until all the threads are offering a fair share of resistance. It is of course no easy matter to produce absolutely correct pitches, but seeing that irregularities do occur, and that relatively fine threads in the nuts are dangerous, it would be an advantage to aim at not allowing the bolt thread pitch to exceed a certain limit, and also not allowing the nut thread pitch to fall below this limit.

Some insight into the nature of the stresses which occur in bolts and nuts is afforded by the following short modified extract from the paper previously referred to.

The depths of the nuts are assumed to be equal to the cores of the bolt. The numbers in the table, express the resulting stresses at the roots of the threads in the bolts in pounds per square inch for every 10,000 lbs. stress in the unreduced shank of the bolt.

No. of Threads per Core	Bolt and Nut Thread Pitches are equal		Nut Threads are 1-1000 coarser than Bolt Thread Pitches	
Diameter.	Bottom of Nut	Top of Nut	Bottom of Nut	Top of Nut
8	30,800	5,700	17,400	21,600
16	29,700	3,500	13,400	22,500
32	33,400	1,900	11,500	27,500

When the pitch of the nut thread is finer than that of the bolt, the maximum stresses at the roots of the threads are approximately given by the formula—

$$s = 4\sqrt{[T.Z.D. \div 2h \times (T \div 3E + 1/p)]}$$

where T is the tension in the core of the bolt of the diameter D. The depth of thread is h, E is the modulus of elasticity, say about 13,000 tons per square inch, and Z is the shearing modulus of elasticity of the threads, say 1,000 tons per square inch. The ratio of excess pitch of bolt thread over nut thread pitch is 1/p. The above formula does not apply unless 1/p is larger than 1-1000. For a tension stress T of 6.5 tons per square inch the value of T/3E is about 1/6000. We may therefore write—

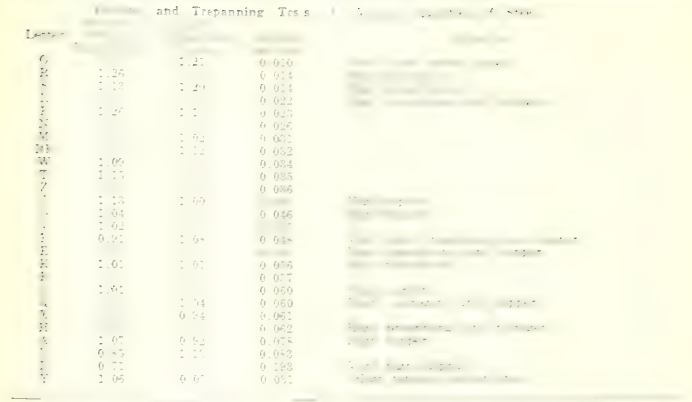
$$s = 4\sqrt{[T.D. \div 2h \times (1/6 + 1000/p)]}$$

Let 2=65 tons, h/D=1-16 and p=1/1000, then s=21.2 tons per square inch, to which shearing stress a portion of the 6.5 ton tension stress has to be added.

If 1/p, the discrepancy between the pitches, should be 4/1000, which was actually the case with a boiler stay-bolt which failed, the shearing stress would be nearly 60 tons per square inch. No wonder, therefore, that this 2½ in. bolt should have failed while its nut was being screwed up.

Doubtless many similar cases occur in practice, but comparatively little notice is taken of them, they being attributed to bad material or carelessness on the part of the workmen. The faulty shape of the threads and pitches seems never to be suspected. However, as this subject deserves the very closest study, it is hoped that cases of broken bolts either of boilers or engines will be mentioned to me for the purpose of fuller investigation.

One reason why it is desirable to look very closely into this matter is the growing practice, started by American automatic tool makers, to supply mild steel which will mill easily. This steel con-



Drilling and Trepanning Tests

Letter			
Q		1.25	0.050
R	1.26		0.054
S	1.19	1.49	0.054
T			0.022
U	1.27	1.1	0.025
V			0.025
W		1.04	0.055
X		1.12	0.052
Y	1.09		0.054
Z	1.17		0.055
1			0.086
2	1.13	1.09	
3	1.04		0.056
4	1.02		
5	0.91	1.04	0.048
6			
7	1.01	1.01	0.056
8			0.057
9	1.01		0.059
A		1.04	0.059
B		0.94	0.062
C			0.062
D	1.07	0.92	0.075
E	0.85	1.17	0.048
F	0.72		0.188
G	1.05	0.97	0.051

tive boiler had to be removed on account of their brittleness, and other loco boilers having screwed stays from the same steel-maker are constantly breaking their stays.

The above-mentioned new stays contained 0.06 per cent. sulphur, 0.09 per cent. phosphorus, which is already rather high, and .020 per cent. nitrogen, which is very high and suggests that the steel maker had been using a large percentage of Bessemer scrap.

Some time ago, Mr. Dempster-Smith of the Manchester Municipal College, kindly carried out some drilling and trepanning experiments on samples of steel plates of which the chemical analyses and other tests will be found in my previous notices. As there was a marked blunting of the tools after drilling or trepanning a few holes, a standard sample of steel was drilled for comparison both before and after drilling two test piece holes.

In table 11. the first column contains the distinguishing letter of the sample. The second one contains the relative number of revolutions of the drill per inch of depth of hole drilled, the load on the drill being constant. The third column contains the relative turning force for enlarging the drilled holes to a given size by trepanning, the rate of feed being constant. The fourth column contains the percentage of sulphur, and the fifth one contains remarks about the other impurities.

It will be seen that only 0.022 per cent. sulphur offered a maximum resistance with 0.198 per cent. offered a minimum resistance of 0.71 and 0.89, say 0.8 mean. In other words, the increased percentage of 0.171 per cent. sulphur reduced the cutting resistance by 40 per cent. In view of the advantage offered by sulphur steels, efforts should be made to overcome the liability to brittleness in the presence of nitrogen. Up to four per cent. of manganese may also be present in large percentages, and then the bars are very brittle. Quite recently all the stays in a large locomotive boiler had to be removed on account of their brittleness, and other loco boilers having screwed stays from the same steel-maker are constantly breaking their stays.

seem to have been tried for motor chains, because blanks made from them punched very easily, but the experiment is said to have proved a failure.

A METAL WITHOUT A PRESS-AGENT

Zinc Needs Publicity

George S. Harney, of the American Zinc Products Company, Greencastle, Ind., advises in an address before the American Zinc Institute, that whenever zinc is used or mentioned in future, it should be called by its proper name. The public must be informed of its desirable qualities and its varied industrial applications. What becomes of all the zinc? For what is it used? The average citizen remembers the sheet zinc that used to go under stoves, and he hazily knows that he has seen zinc-lined refrigerators. But zinc is at work in thousands of other places under what Mr. Harney calls "many noms de plume and noms de guerre," and he is determined that these disguises shall be stripped from it. He says:

"We ought to so change our phraseology and nomenclature that the word 'zinc' should be omnipresent in our discussions. 'Jack' and 'spelter' are good names, perhaps, but they do not convey to the world that they are zinc. 'Galvanizing,' besides being a misnomer, is certainly not the correct term for coating a substance with zinc. 'Zincking' a substance—zinc-coated sheets, nails, wire, and similar material—would be an expression that would convey to the ear of the public the fact that zinc was used to preserve that metal or substance, and from this the public would learn that zinc was the principal factor in the operation. Similar reasoning should apply to 'sherardizing' and other processes in which zinc and the preserving qualities of zinc are necessary to give the other metals life and standing in the commercial world. I suggest these changes for the reason that not one person in ten of this great public that we want to win to the uses and benefits of 'spelter,' 'galvanizing,' and 'sherardizing' have any relation to zinc and its preserving properties. And if the public did know these things our battle would be half won.

"Secondly, zinc needs a press-agent. I do not refer to the grandiloquent and verbose personage who writes the fanciful stories of the prima donna's diamonds, nor the lurid picture of the circus, its daring performers and rare animals, but the artist that would write the interesting stories of the usefulness of this strange metal and of the benefits it confers on mankind. Such articles I [illegible] trade papers and publications, and, in view of the fact that the newspapers are searching everywhere for readable and instructive paragraphs that will interest humanity, they would no doubt willingly print them. . . . .

"If short and readable stories concerning the diverse and industrially valuable applications of zinc are furnished them, they will give such articles their initial push on their voyage over the world and on their mission of instruction. But these stories must use the word 'zinc.' The daily paper wants general items of interest, and not trade-names. It wants short stories of human interest.

"Stories about zinc may be semi-scientific in their nature. The world is ready to hear again the story of the Swiss clock that is run by the expansion of zinc. It will willingly read of the non-conducting properties of zinc as it relates to heat and cold. Why, even the story of how in years past zinc has been abused in having to work under so many noms de plume and noms de guerre is a good one and will not only be read, but it will correct an old-time error and aid the work we seek to do.

"I recall the concentrated publicity that has been engendered by manufacturers and producers of other products, and they were not so favorably situated. Take cement. One cent per barrel from the manufacturer, contributed to a central bureau, gave his product the publicity he sought. The railroad was told how to construct a water-tank, and the farmer was [illegible] trough of cement. Within the year, [illegible] terms and knew of its use. Team-work won for cement. Team-work will win for zinc! . . . .

"In the coming years zinc is to have a more extensive use. Those who fabricate the pig zinc or rolled sheets in a finished product must tell the world of its utility and usefulness, if they are to succeed. Be it a sheet for a roofing, or a slab for casting, the word 'zinc' should follow on to the consumer.

[illegible] beecos, and like commodities, in zinc [illegible] zinc container, and that zinc is the very metal that will properly preserve the

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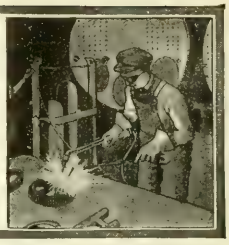
WELDING AND CUTTING



Repairing a Large Centrifugal Pump

It Often Pays to Repair, Rather Than Replace Machinery, as the Time Saved is a Great Consideration. Here is a Case Where Both Time and Money Were Saved

By J. H. RODGERS

THE type of centrifugal pump used by dredging contractors and mining operators for such purposes as dredging silt, sand, mud and gravel from the bottoms of channels and for mining soft ore by hydraulic mining system, is subject to excessive wear, due to constant abrasion of the sand and gravel against the inner walls of the pump chamber. When the wear becomes so great as to interfere with the operation of the pump, or "sand sucker," as it is commonly called, it becomes necessary, not only to put the pump itself out of commission for repair, but also to hold an expensive dredging barge and its crew in idleness.

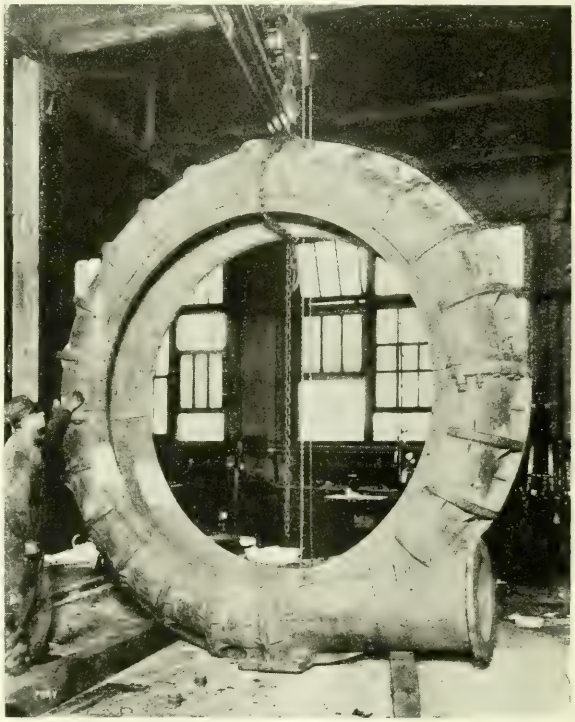
Such a sand sucker chamber that had become badly scored through use was recently restored to practically its original condition by the Chicago job welding department of the Oxweld Acetylene Co., by means of the oxy-acetylene process. When it is considered that new castings would have cost about $3,500, and that the actual cost of repairing by welding methods amounted to only one-third as much, it is not surprising that the contractor decided to repair instead of to replace, especially in view of the still more important fact that repairing enabled him to get the dredge back into service with only a few days' delay, whereas replacement meant a delay of from 10 to 12 weeks.

Delay Meant Great Loss

In order to gain some idea of the cost of delay of a hydraulic dredging outfit, an estimate of the earnings of a dredge will be given. In the year 1912 the United States Government estimated the cost of hydraulic dredging to be 7.18 cents per cubic yard. This figure represented the average total unit cost of operating a fleet of hydraulic dredging vessels. The record for one month for one dredging pump having a 20-inch outlet pipe was 456,000 cubic yards of material. At the average unit cost given above, the monthly cost of dredging this amount of material represents over $30,000. The sand sucker shown in the illustration is much larger than the one referred to above. Furthermore, the cost of materials and labor is much greater to-day than in 1912. When such factors as loss of profits, overhead expenses, non-productive labor and contract penalties are taken into consideration, obviously every week of idleness meant a loss of thousands of dollars.

Over Half Ton of Metal Deposited

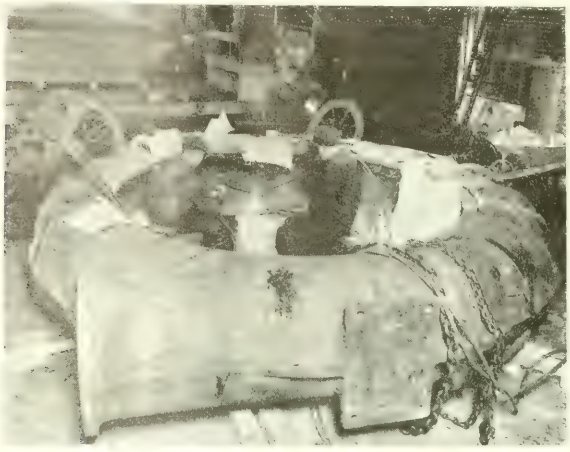
The pump chamber of the sand sucker illustrated is 14 feet in outside diameter, and consists of two massive steel castings having a total weight of 7 tons. The abrasion had been so severe it was necessary to rebuild both side walls of the pump chamber for a distance of 8 inches from the inner circumference. The thickness of the added metal varied



THIS COMPLETED WORK MEANT A SAVING OF SEVERAL WEEKS TIME, AND NEARLY $2,500 IN CASH TO THE CONTRACTOR.

from 1½ to 2½ inches. In addition, a new section, approximately 14 by 18 inches [illegible] welded into the throat of the casting. The latter was approximately 3½ inches in thickness.

In order to insure holding the two halves of the chamber in alignment during preheating and welding they were



THIS CASTING IS 11 FT. OUTSIDE DIAMETER, WEIGHING 7 TONS.

bolted together, and the heavy, outer reinforced sections of the castings were not heated as this would have produced internal strains, either breaking the castings or shearing the bolts that held them together. Preheating by means of charcoal was applied locally for a distance of about 14 inches in from the edges of the flanges, each preheat extending for a distance of 3 feet around the inner circumference.

The total weight of steel added to the castings by welding amounted to 1,264 pounds. The operators, each using an Oxweld blowpipe fitted with No. 15 welding head, worked in pairs. As the heat in the small enclosure where the men worked was intense, it was necessary to hold several welders in reserve and to work on the relay plan, each welding shift ex ending for a period of 20 minutes. Six days were required to complete the building-up work.

Construction Improved by Use of High Carbon Steel

As the built-up surface will be subjected to the same abrasive action of sand and gravel, high carbon steel welding rods were used for the purpose of building up, thereby giving an extremely hard surface, in fact, one that it was impossible to cut with a file, after cooling.

The oxy-acetylene welding work was completed in six days, saving the contractor the expense of several weeks of idleness, nearly $2,500 in cash on the cost of the casting alone, and giving him a pump actually improved in construction, because lined with abrasion-resisting steel.

CUTTING TO A STRAIGHT LINE

There are several methods of following straight lines with the cutting torch, and the one to be used will depend on the conditions, equipment provided and the training of the operator. A line may be followed without a method, by painful concentration on the chalked and prick-punched layout, but this is a hard way. The cutting is likely to be irregular and the operation will tire the cutter. Hand cutting should be done in a manner that requires the least effort and at as nearly uniform speed as possible. Otherwise, the gas consumption will be excessive and the cutting will be ragged.

The method often recommended for long cuts is using a light angle iron laid on the part parallel to the cut, and at such a distance from it that it will permit the torch to be supported on the upturned flange with the head held against the edge, so that the angle forms both a support and a guide. But the cutter cannot always use an angle iron, and it is therefore highly desirable that he learn to cut by another method which will be general in application. The method cannot be very clearly described without illustrations, but sufficient may be said here to give the general idea.

The operator, having laid out the line of the cut, takes a position with reference to the beginning of the cut so that he will be able to move the torch nearly one foot before having to change position. The left elbow is rested on the piece to be cut, with the palm up and the fingers and thumb lightly grasping the torch tubes. The right hand holds the handle, and, as the cut progresses, the left hand is rolled over on the edge of the palm as far as possible before stopping. A straight cut, nearly one foot long, can be made in this manner without changing position.

Another method, somewhat similar, is swinging the left arm on the point of the elbow and letting the torch slip back and forth between the thumb and fingers of the left hand. This latter method is not so elegant, however, as the one just described, for the reason that the operator then must guide the torch with the eye, making it necessary to concentrate on the line. In the before-mentioned method the tip will automatically follow a straight line, provided the correct position is taken and maintained throughout the cut.—"Autogenous Welding."

RESCUE WORK

Oxy-acetylene in rescue work was recently again employed by firemen of the New York City Fire Department, when a young boy was caught in the machinery which operates one of the amusement places, known as the "Witching Waves" at Rockaway Beach, New York.

The boy in some unexplained manner crawled under the waves and was caught in what is known as the left arm rocker. This carried his body up against the bottom of the steel waves and clogged the machinery, which stopped and held him.

It was some time before his cries could be heard, and then the firemen were called. Captain Henry Misfeldt tried to pry him loose and tried to chop the machinery to pieces. It resisted all efforts until an acetylene cutting torch was secured.

The machinery was then cut apart and the boy released. He is seriously injured, in the opinion of the hospital authorities, and would probably have died where he was caught had it not been for the use of the torch.

BREAKING IT GENTLY

The proprietor of a certain traveling menagerie had struck a streak of bad luck, having lost a number of valuable animals by accident and otherwise.

Therefore, it was with sympathetic mien that one of the keepers undertook the task of breaking the news of another disaster. He began thus:

"Mr. Smith, you remember that laughin' hyena in cage 9?"

"Remember the laughing hyena?" demanded the owner angrily. "What the deuce are you driving at?"

"Only this, Mr. Smith, he ain't got nothin' to laugh at this morning."

WITHOUT A PRESS AGENT

Continued from Page 321

contents. Nay, more: the man who offers the spurious substitute must be publicly denounced, and, if possible, prosecuted for his counterfeiting. We must no longer keep our light under the bushel. It is zinc that preserves steel and iron, and wood and fabrics. We must proclaim this fact wherever possible. Every advertisement must boldly proclaim that the product is zinc, and science will verify that zinc is the best metal for such use."

DEVELOPMENTS IN SHOP EQUIPMENT

¼ IN. SOLID DIE, SINGLE STROKE HEADER

The Kent Machine Company of Kent, Ohio, has recently placed on the market a new and improved solid die, single stroke header of ¼ in. capacity, which has many decided advantages when viewed from the standpoint of construction, maintenance and operation.

The principal features of excellence in this machine as provided in the design are as follows:

A Scotch yoke mechanism with solid wedge adjustment replacing the usual connecting rod, with right and left-hand thread adjustment.

A cut-off of generous proportions and great strength with ample wearing surfaces.

A friction feed of unusual accuracy and flexibility.

For assembling and dis-assembling, to repair or otherwise get at the inner working parts of this header, especially convenient arrangements have been provided.

A very small floor space for the capacity of the machine is a feature.

The illustration shows this machine to be strong and heavy in its design, with metal well located to withstand the heavy stresses to which a header is subjected. The bed frame is large in cross section where the tension forces act, and is well reinforced to resist any torsional or distorting forces arising from heading the special non-symmetrical heads at present so much used by automobile manufacturers. The bearings for the crank shaft are large, made of a special alloy bronze and located close to the crank pin, thereby giving no opportunity for any springing or bending action.

The use of the Scotch yoke mechanism for driving the cross-head forward eliminates that vibratory action in the machine which is found in those using the oscillating connecting rod, and at the same time gives such a direct action on the cross-head that it does away with any flexibility due to the angularity of connection. The fly wheel has a tapered square hole in it which fits the end of the shaft, having the form of a frustrum of a pyramid. This is a decided advantage when it is necessary to dis-assemble the machine and, at the same time, gives a positive drive to the full capacity of the belt.

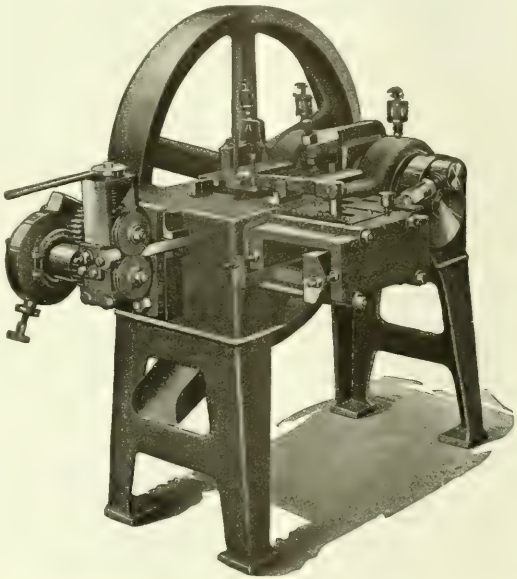
Particular attention has been given to the design of the cut-off mechanism and all parts are of good size, with extra large wearing surfaces and liberal adjustments for wear. The same thought and attention has been given to the accessibility feature in the design of this portion of the machine, and, in case of repair, the removal of four nuts opens up practically the entire cut-off actuating mechanism.

A friction feed is provided, consisting of two grooved feed rolls actuated by a combination ratchet and ball friction device, which in operation gives exceptionally accurate results. A feed stop finger is provided to look after any overfeed setting of the feeding arrangement, although the accuracy of the fe- lieves this finger from any great amount of work or pressure. The length of the feed is regulated and controlled by the hand and check knobs shown projecting from the lower part of the faced disc. The feed may be instantly thrown off by an eighth turn of the lever located on top of the feed roll support.

To dis-assemble the header to get at any portion of the inner working parts is a very simple process. For instance, by removing the gibs used to hold the cross-head in place, the entire cross-head and connection with the crank may be lifted out without disturbing other parts. This is a very important feature when we consider the amount of labor necessary to take down the connecting rod header. The cut-off and feed arrangements may be removed from the bed as units; in fact, one of the strong points of the design is the fact that it has been laid out on the unit design principle.

The adoption of the Scotch yoke mechanism has reduced the size of this machine to such an extent that the saving in floor area of a battery of these machines is a material one.

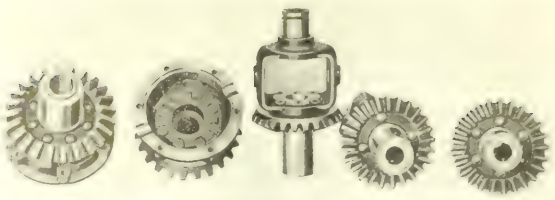
The Kent Machine Co. have had this machine in operation in one of the largest rivet plants in this country for the past two years and its success has demonstrated, without doubt, its efficiency and its serviceability. This is the first of a line of rivet making machinery to be placed on the market by this company.



GENERAL VIEW OF THE HEADER.

THOMS[illegible] ELECTRIC RIVETING MACHINE

A TYPE C electric riveting ma[illegible] capacity for handling medium-sized work, has recently [illegible] the ma[illegible] Welding Co., Lynn, Mass. This machine will accommodate any commercial lengths of rivets [illegible] in. in diameter, and it has been so designed that the cycle of operations may be easily controlled with a minimum expenditure of physical effort on the part of the operator. The rivet to be heated is first set in place in the work, which is then laid on the lower die of the riveting machine, so that the head of the rivet rests in a small recessed pocket provided on the face of the lower die in order to preserve its shape. By means of a hand-controlled lever mounted on the sliding head of the machine, the operator now swings the whole head to the left, thus bringing the right-hand copper die directly over the rivet shank. Then by pulling down on the operating handle, the copper heating die is forced into intimate contact with the upper end of the rivet shank that is to be heated. By the application of pressure on a push-button on the outer end of the controlling lever, the electric current is turned on and heating of the rivet is started. When the rivet shank has reached a temperature corresponding to a white heat, the operator releases the pressure of the hand-lever, which allows the copper heating die to be lifted out of the way by a spring, after which he swings the whole sliding head to the right, thus bringing the steel heading die into line over the hot rivet. He then depresses the foot control at the right-hand side of the machine, which engages the clutch on the belt-driven fly-wheel with the press mechanism and causes the heading die to make one full down stroke, after which it returns to the starting position. The clutch is automatically disengaged upon the completion of the return stroke of the press, regardless of whether the foot control is held down or released.



VARIOUS TYPES OF WORK DONE ON THIS TYPE C MACHINE

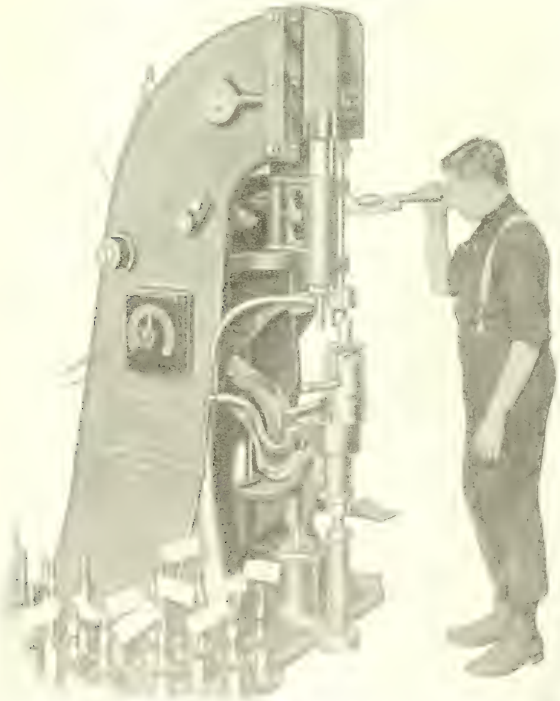
TAPPING MACHINES

The Bicknell-Thomas Co., Greenfield, Mass., have recently brought out a bench type tapping machine.

Some of its distinctive features are: compactness, can be operated by girl as there are no protruding parts to catch the fingers or clothing; has cone friction driving mechanism which enables the operator to tap to the bottom of a hole without danger of breaking the tap and it also enables the operator to tap a larger number of holes per day. Twenty four 3-16 holes have been tapped per minute. It has two-speed noiseless gear transmission, which is constantly reversing in grease, oiling all parts of the machine with the exception of the motor.

All spindles are hardened and ground and the main spindle has ball bearings.

The table slide, which is made to hold suitable work holding fixtures, has ball bearings, making it very sensitive to operate, has adjustable stop for the table and is furnished either with or without oil pump and piping.



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SOME NOVEL USES FOR SMOOTH-ON.

The MacLean Publishing Company
LIMITED
(ESTABLISHED 1887)
JOHN BAYNE MACLEAN, President. H. T. HUNTER, Vice-President
H. V. TYRRELL, General Manager.
PUBLISHERS OF

CANADIAN MACHINERY
AND MANUFACTURING NEWS

A weekly journal devoted to the machinery and manufacturing interests.

B. G. NEWTON, Manager. A. R. KENNEDY, Managing Editor.
Associate Editors:
W. F. SUTHERLAND T. H. FENNER J. H. RODGERS (Montreal)
J. H. MOORE.

Office of Publication, 143-153 University Avenue, Toronto, Ontario.

Vol. XXII. TORONTO, September 25, 1919 No. 13

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Strike or Revolution?

THE strike in the steel mills of the United States will take a few days to become clearly defined. Strikes do not stand still. It is easier for them to grow than dwindle and the reason is easy to see. The man who wants to work is marked, and at once becomes the object of pickets, going and coming, and his hours at home are turned into hours of torture for himself and family. It is easy for him to quit work, and very hard for those who want him to work to get in touch with him. Hence it would be natural to look for a growth rather than a shrinkage in the number of those on strike.

There is something about this latest strike that needs explaining, and that is the connection of the American Federation of Labor with it, in view of the fact that the leading spirit of the strike, William Z. Foster, is an I.W.W. agitator, a Syndicalist and an advocate of bloodshed and brute force.

There is plenty of proof of this. Earl C. Ford and Wm. Z. Foster are given as the authors of a book called "Syndicalism." In the last paragraph of the book these words are found: "All workmen interested in this movement, to place the American labor movement upon a Syndicalist basis, can secure full information by communicating with . . . . ." and here follows Foster's address.

This matter has been put squarely before Foster. George Smart, one of the editors of *Iron Age*, went to Pittsburgh and after finding Foster's office, put the accusation straight to him. In Mr. Smart's own words:—

"I said to Foster that I understood he was the man who, at the meeting of the American Federation of Labor in St. Paul, in 1918, introduced a resolution providing for organization of the steel workers and that since he had been in charge of the organizing campaign; that at one time he was an active organizer of the I.W.W. and in 1911 was sent to Europe by that organization and spent much time in France, Germany and Austria-Hungary, mingling with radical laborites; that he was one of the authors of a book on "Syndicalism"; that he appeared at Budapest, Hungary, in August, 1911, and attacked the credentials of James Duncan, first vice-president of the American Federation of Labor, as a delegate of the trade unions of the United States, making a vigorous effort to obtain a seat in the convention on the representation that the I. W. W. was THE labor organization of the United States; that during his stay in Europe he was a regular contributor of "Solidarity," the organ of the I. W. W., and after returning to the United States became a candidate for editor of "Solidarity"; that failing in his ambition, he announced that he would no longer remain in the I. W. W., but would join the A. F. of L. and "bore from within"—that is, get into the stronger organization and inoculate it with his theories."

From evidence produced those charges stand as made. The book published by Ford and Foster is the rankest piece of revolutionary propaganda let loose yet. Here are extracts:—

"Another kind of sabotage widely practised by Syndicalists is the tactics of either ruining or turning out inferior products. Thus, by causing their employers financial losses, they force them to grant their demands. The numerous varieties of this kind of sabotage are known by various terms, such as 'passive resistance,' 'obstructionism,' 'pearled strike,' 'strike of the crossed arms,' etc."

Again, speaking of the industrial revolution:—

"**Bloodshed.**—Another favorite objection of ultra legal and peaceful Socialists is that the general strike would cause bloodshed.

"This is probably true, as every great strike is accompanied by violence. Every forward pace humanity has taken has been gained at the cost of untold suffering and loss of life, and the accomplishment of the revolution will probably be no exception. But the prospect of bloodshed does not frighten the Syndicalist worker, as it does the parlor Socialist. He is too much accustomed to risking himself in the murderous industries and on the hellish battlefields in the niggardly service of his masters, to set much value on his life. He will gladly risk it once, if necessary, in his own behalf. He has no sentimental regards for what may happen to his enemies during the general strike. He leaves them to worry over that detail."

One of the most revolting things in the book of which Foster is joint author reads as follows:—

"**Neo-Malthusianism.**—The Syndicalist is a 'race suicider.' He knows that children are a detriment to him in his daily struggles, and that by rearing them he is at once tying a millstone about his neck and furnishing a new supply of slaves to capitalism. He, therefore, refuses to commit this double error and carries on an extensive campaign to limit births among workers. He has been a powerful factor in reducing births in France, which, according to recent statistics, are annually 35,000 less than the deaths. He is turned from his course neither by the inspired warnings of physicians nor the paid appeal of patriots. He has no race pride and but little fear. He sees in 'race suicide' an effective method of fighting his masters; therefore, he uses it."

Now, the thing is this: Where is the line going to be drawn, if a man holding such views can have the power to call tens of thousands of men to quit work at a given moment on a given day?

Of all the strikes, good, bad and indifferent, that have been staged in recent months, the present one requires the most explaining. The great majority of the strikers are foreign born, from lands where their lot was unspeakably worse than in United States. The reason for this strike is not floating on the surface.

The widespread development of electric power is fast bringing the electric furnace to the front in foundry operations. Not only is it being used in the production of high grade steel castings, but there are indications that its installation in grey iron and malleable foundries will be one of the marked developments of the near future. Thus will be eliminated, certain coal and coke uncertainties and the country's electric wealth be still more widely applied to industrial requirements.

The Coal Business

[illegible] who want[illegible] and the company that owns it when it comes from the mine.

There are coal dealers in the city of Toronto who cannot buy coal from the mines. Were they to approach the company that takes the coal from the mines and ask to be allowed to purchase one or a hundred cars, the answer would be, "Get out of here!" Perhaps not in those words, but the meaning would be the same, and the net result of his purchasing expedition would be likewise.

These dealers are of the opinion that there is so much juggling between the mines and the coal bins of the nation that the last buyer is paying more than necessary.

It is strange beyond explanation that just at a certain time each year there should be a shortage of coal. The well-to-do will tell you to buy in the spring.

Very well, but there are thousands of homes where they cannot afford to buy in the spring. There are thousands of homes where they have to buy coal a ton at a time. There are thousands of little buyers who have no association or organization to protect their interests. Not much. They can shiver or sweat as their luck comes or goes.

The coal business, from pit to furnace, has been raked over and pawed over times without number, and each raking and pawing has seen the ultimate buyer going down a little deeper into his pocket, and has seen the little buyer standing in line a little longer.

The Port Colborne Disaster

THE coroner's enquiry into the fatal explosion at Port Colborne has ended in the way that most of these enquiries do, by a verdict which exonerates everybody concerned, and suggests tacitly that the thing just had to happen. With this view we are not inclined to agree. During the enquiry, evidence was adduced which showed that blowers which are fitted for the express purpose of removing dust, were not allowed to be used, and that in one instance an elevator nearly lost its license through using the blowers after receiving notice to desist.

The Port Colborne elevator is under the control of the Department of Railways and is unique in that respect. However, the Board of Railways does not seem to have interfered in the use of the blowers. This action seems to be the province of the Board of Grain Commissioners, which will not allow the dust to be removed before the grain is weighed. The whole trouble seems to lie in the question of who is going to bear the loss in weight if the dust is removed before the grain is placed in the elevator, and the question is shirked in a manner that deliberately endangers human lives. The fact that the risk is always present where there is dust is amply proved by the number of minor explosions which take place, and as further proof, we have the explosion of a nest of elevators in Kansas City just a few weeks after the Port Colborne disaster. Here again the results were fatal.

Boards have been appointed to enquire into this situation, and they have sat and presumably deliberated and made reports. The evil still persists. Truly it would seem that the cheapest thing in this country is human life. While the country is filled with exhortations to count "Safety First," men are being killed by a preventable cause, which is not prevented through the greed of the principal users of the elevators. The presence of a dust-laden atmosphere, whether it is coal dust, grain dust, sawdust, or textile material dust as in the New York triangle fire, is a source of danger of the highest potential. Its admixture with the surrounding air is so complete, that the introduction of the tiniest spark starts combustion, which takes place so rapidly and perfectly that it is explosive in its intensity.

There may be some loss occasioned by blowing the dust, or there may be some reason apart from that of financial loss against the use of the blower. The public and the men who work in these elevators should be satisfied beyond any reasonable doubt that all necessary precautions are being taken to make their occupations a safe one.

Our Old Friend John Barley

THEY used to raise a song on high to old John Barleycorn, and voices filled with clinkers jarred the early hours of morn, when chaps who made their homeward jaunt with tangles in their feet, and tried to find a keyhole somewhere along the street.

Oh, in them days what's went and gone and never to come back, men used to meet their gentle wives, salute 'em with a whack, and put their feet upon the couch and muss up all the duds, when they had lingered far too long before the cheering suds.

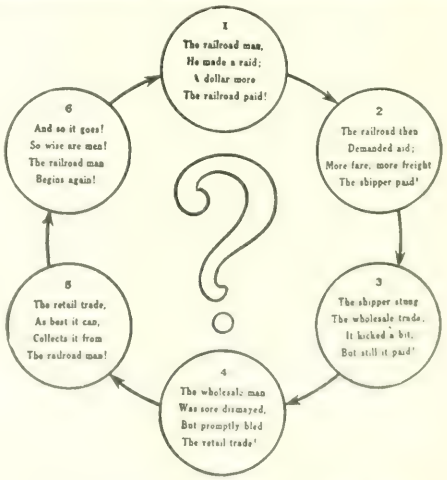
They used to try to make a sneech, they used to start a fight, they used to decorate the porch and sleep out there all night—they never had a dollar then to buy two pair of shoes, when they was passin' out their coin to saturate in booze.

Men used to take and plant their feet upon the old brass rail, and call up thirsty ones to quaff large hunks of rye and ale.

But now they've learned to wend their ways unto the water spout, and souse their long and thirsty throats without a drunken bout.

So when they come to us and say old Barley's at the door and wants to come and dwell with us like in the days of yore, we'll double up our horny fist, we'll grab the boot-jack, too, and swat that chap who used to bring the red nose and the stew.

We'll take him by the collar and we'll lead him to the fence, and tell him for to speed up quick and take his carcass hence—and when he tries to tell of days when we swigged rye and beer, we'll shake our horny fist and say: "John Barley, scat from here!"—ARK.



"The vicious circle is infinite; increased wages are over-capitalized for inflated profits, and the cost of goods mounts faster than the wage level."—Statement of the Four Brotherhoods of Railroad Employees. From the New York *Evening Post*.

Hours of Work a Point Not Settled at Ottawa

Labor Delegates Were the Orators, While the Employers Seemed to Have a Greater Array of Facts and Statistics at Their Disposal —Summary of Industrial Conference

By T. M. FRASER, Ottawa Representative of MacLean Papers

OTTAWA.—It was the intention of the Government, in order that there might be no appearance of capital and labor being drawn upon opposite sides with the suggestion that they were in hostile array, that the delegates to the National Industrial Conference should take their seats in chance fashion; but the sheep and the goats automatically sorted themselves, the representatives of capital occupying the seats on the left of the chairman, Hon. Senator Gideon Robertson, while labor faced them on his right. Down the middle of the Senate Chamber were grouped the representatives of the Governments. Such of the common people as could get room hung about the door of the chamber, though there were few of these.

The daily proceedings of the conference have been so fully reported that it is not the intention here to do more than mention a few of the interesting features and side-lights. How much, if anything material the conference may accomplish will not be known immediately. Broadly speaking, the expectations of the different parties to it might be summed up sufficiently well by an examination of three or four of the principal speeches delivered. As. Hon. W. L. Mackenzie King very ably pointed out in the able speech he delivered on the opening day of the convention, the parties to industry and its problems are not the two, capital and labor, most commonly mentioned; they are four: Capital, labor, management, and the community. And of these, the community is the most important and the most interested, in that it embraces the other three as well as the people in general.

While the two main parties to the conference came together with as much diplomatic courtesy as could be expected, and while the proceedings and debate suffered nothing from comparison in this or any other respect with any debate in the House of Commons, it would be only camouflage to say that capital and labor were not very far apart on their conception of what was rightfully due to each. Self-interest rather than pure reason has dominated the councils of both for so long that it is vain to expect that now or, probably, for a long time to come shall we find either being distinguished by a spirit of "sweat reasonableness," or see self-interest give way to self-sacrifice. On the first day of the convention, if we could have read the mind of those who looked across at each other, we might have found distrust, resentment, and the sense of being subjected to tyranny. It was plain that each expected more from the party in the middle (the Government) than from the party opposite.

The Two Attitudes

The attitude of Labor at the convention was one of aggressiveness. Capital typified resistance. Labor said: "How much can we get?" Capital pondered: "How far can we afford to go?" And if the resistance of capital to the demand, for instance, for a 44-hour week was strong, it must be borne in mind that that, in the words of one of the labor representatives, was "not an ideal, but a compromise." And when Mr. Tom Moore, president of the Trades and Labor Congress, and chief labor representative, exclaimed heartily, "Hear, hear," those present were reminded that he himself, in a speech at Toronto not long ago spoke of a 36-hour week as about right. Capital, recognizing the necessity of production, sees the hours of labor heading towards an impossible minimum, with overtime, the handmaiden of the "shorter working day," reaching an impossible maximum. Capital believes, and not without justification, that the ideal of the vast majority of working men is to cut the length of the "straight" working day as short as possible in order that more overtime, with its enhanced rates, may be secured. The plea of certain of the speakers among the labor representatives that, with the present working hours, there is no time left to the workingman for "improvement," is sufficiently refuted by figures which the Minister of Labor introduced for the purpose of showing that the shorter day already obtains in large measure in Canada. Forty-seven per cent. of the working men of Canada already work eight hours or less.

The Farmer's Status

This question of the reduction of the hours of labor—a constant scaling down of the length of the "straight" workday, then, is the big point—at least the big controversial point—of the convention. As stated above, it obtains so commonly that employers must, on the whole, be far from making much fight against it, but the object of labor is to have it made a statutory matter for the whole of Canada. I think the final quietus was put on this in a brief and moderate speech by Hon. Charles A. Dunning, Minister of Agriculture, and in charge of labor matters in the Government of Saskatchewan. He desired to have it made plain in the status of the farmer, who was in a sense both a capitalist and a laborer, and who represented probably the largest industrial element in the population of Canada, under a statutory standardization of the hours of labor. "It seems to me," said Hon. Mr. Dunning, "as a farmer of very long experience, that until it is possible for you to legislate to control the sun and the winds and the clouds and the rain, it is impracticable for you to legislate to effectively control the hours and the distribution of labor in agriculture."

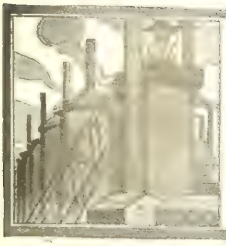
It seems scarcely probable that agricultural labor, even if omitted from the operation and benefits of any possible 8-hour or other day which might be made law, would long rest content under this exclusion, or that organized labor could refuse to support the extension of the principle to them. As was also pointed out by Mr. Dunning, if working conditions are to be made still more attractive in the cities by shorter hours, the difficulty of getting men for farm work would be almost insuperable. The consideration of possibilities of this sort struck the members of the convention very forcibly.

Eloquence vs. Facts

What would strike the impartial observer of the proceedings was that the right side of the assembly seemed to have almost a monopoly of the eloquence. There was scarcely a man among the many who spoke for labor but could present his arguments in well-chosen and grammatical language, and without a trace of diffidence; there were some who were speakers of a very high order, while the speaker with perhaps the most distinct enunciation, the most clear-headed manner of thinking, and the most fluency in the whole assemblage was a tailoress of Vancouver —Miss Gutteridge. She is an Englishwoman—and here it might be noted that the great proportion of the representatives of labor present were not Canadian-born. In fact, very few were. Perhaps the other ninety per cent. of labor in Canada, which was not represented at the convention, belong largely to that class. I mentioned to a representative of the manufacturers this striking fact that the speaking ability was so largely confined to the other side. "Naturally," he replied. "They spend most of their leisure time at it, and practice makes perfect. We have been too busy trying to raise the payroll to have had much time for practising oratory."

I think it would be fair to say, however, that if the position of the labor

Continued on page 336



MARKET DEVELOPMENTS

Canada Watches the U. S. Steel Strike

May Have an Important Bearing on the Markets Here—Structurals Are Much in Demand—Machine Salesmen Report Orders as Being Very Satisfactory

THE MARKETS AT A GLANCE

THE strike in the steel mills of United States has a very direct interest for the whole Canadian steel, iron and machinery trade. Stocks in the warehouses of this country are fairly well filled, but warehouse business is not the kind that keeps things going, for most of the tonnage goes direct to the mills and is shipped direct to the purchaser, warehouse prices being higher and less popular in consequence. Canadian steel mills are in good shape to take care of many lines, but not so in plates particularly, a hold-up of which would be poor business were it continued for any length of time.

There is a big demand for structurals in Ontario at present, and one of the dealers took occasion to remark that now that the United States mills stand in danger of being shut off, the rush sets in to buy structurals. Big tonnages are in the offices of architects and fabricating concerns, and although it is late in the season it looks as though the much talked-of buying movement in structurals has set in.

Machinery dealers report good business. In fact many of the best houses are getting all they can handle and a little more. They find it difficult to secure the machines as rapidly as needed.

Speaking of the machine tool situation, it is interesting to note that there is not much export business going to United States firms at present. For instance, Sweden is in need of quite a large list of machine tools, and the chances seem to be that Germany will get the business. The reason is this, that Germany can undersell United States in Sweden to the extent of between fifty and sixty per cent Prices, the rate of exchange and the low value of the German mark all help to stimulate this movement.

Prices remain firm in all lines in the machinery field. Many cases have values up to war times, and there does not seem to be any good evidence in sight that a reduction is even being considered.

U.S. STEEL STRIKE REFLECTED IN MONTREAL MARKET CONDITIONS

Special to CANADIAN MACHINERY.

MONTREAL, Que., Sept. 25.—The near approach of a tie-up in the steel industry has been partly responsible for the quiet tone of the existing market, and the general situation here has been in a reserved state of tension for the past week. To some extent this is still more or less evident, but a more optimistic feeling prevails throughout the trade, and it is thought by many that the strike situation will be confined to those works that are now involved. However, it is premature to even guess to what extent a strike of this nature will affect general business. Business in this district is moving steadily, but it is still of a conservative character. Metals are moving freely on a firm market.

Machinery [illegible] provement [illegible] pronounce[illegible] affected by the strike of steel workers.

Local Interest in [illegible]

The attention of the entire steel industry is [illegible] that is in [illegible]

It is a little too early to pass on the possibilities that may arise as a result of the strike, but the situation and the developments will be closely watched by all those associated in any way with the steel business. Asked as to the effect on Canadian conditions, a dealer here stated: "It will be some days before we can tell the effect of the strike, but unless the cessation of operations spreads throughout the entire steel producing districts, and the independent mills become involved, we will not be affected here to any great extent. We are carrying considerable stock, and this will be ample for existing requirements for some little period. Then again, we will be able to get supplies in from the States as there are many sources of [illegible] fected by the strike. Ship plates will be harder to get, but many of the yards here are fairly well stocked and would be able to operate for quite a spell before feeling the pressure of the strike. [illegible] condition here, but, as stated before, it [illegible] of the immediate future. Should the strike spread and other mills become involved, and the situation develop into a general fight between the men and the producers, the effect will naturally be felt here, and as a consequence prices may show a tendency." Trading here is of a general character, not heavy but of steady volume. Prices are unchanged and very firm.

Used Machinery Being Absorbed

While it cannot be said that the business in the machine tool trade is of the active kind, there appears to be visible signs that the demand is improving, even though slight. Some dealers report a very good week with new tools showing up better. It was remarked by one dealer that the available supply of used machinery is apparently diminishing, and it is believed that no small [illegible] already been absorbed. In this connection [illegible] season we have [illegible] number of [illegible] many of the shell shops, such as lathes, [illegible] aggregate has been quite heavy and these tools have been going to all sorts of places. Quite a number have been acquired by men who, prior to the war, lived on farms or in villages throughout

the province. Inquiry showed that many of these men who had attained a fairly good knowledge of machine shop work intended starting a small repair shop, where they hoped to reap returns on their shell experience. The money they had earned, and the reasonable price of the old machines were factors that induced them to start out on their own account, and some of these men are doing well."

Scrap is Unchanged

The tension that has been evident in steel circles over the possibility of a strike in the States has been reflected here to some extent, and as the atmosphere to-day is filled with the first real signs of strife, the trade here is anxiously awaiting further developments. The past week has seen little but normal trading in scrap and the business passing is mostly going to the foundry trade, as the demand for machinery scrap and stove plate is of good volume. There is a steady movement in the non-ferrous scraps but the demand in this respect is about as usual. Dealers are not disposed to state what will take place should the strike attain any degree of magnitude, and for the present will hold to current quotations. Should the strike be of long duration it is altogether likely that the market here will be stronger. However, it is the opinion of the trade here that a settlement will be made before the close of the week. Word received from Cleveland by a local dealer was to the effect that the situation last Friday was more serious than it appears to be to-day. Few here will commit themselves, and several days must elapse before the full possibilities will develop. Price quotations remain unchanged with the market firm.

STILL ACCEPTING ORDERS FOR STEEL

No Difference Noticed Yet—Business in Structurals is Better Than Ever

TORONTO.—The trade in general watches the steel mill strike in the United States with keen interest. While some lines may not be hit for some time to come, there is a feeling that cannot be disguised that the ramifications of the struggle are extremely wide, and that no particular section of industry can claim immunity.

As far as CANADIAN MACHINERY could learn as this issue went to press, the firms selling for the American steel mills were not making any difference in their selling policy. They were accepting business, and reported particular activity in structural material. In fact one of the dealers emphasized the fact that the amount of structurals offering now was an outstanding feature of the business. "Those who want to buy now and who may be inconvenienced in the matter of delivery are paying the price for staying out of the market too long. For months past there has been plenty of capacity in the mills rolling structurals to give splendid deliveries, but prospective builders continued to stay out, thinking that the prices were going to come down. It was useless to point out reasons why prices would not come down, although the steel trade has known for a long time that prices were going to stay up as costs would not permit anything else."

It must be remembered, of course, that business placed with the mills at any time is subject to strikes and other delays over which the authorities can have no control.

Selling is Brisk

Machine tool business is good in this district. And when that is said, there are no reservations or unstated conditions. There are, in some cases, good machines tools of standard makes standing on the floors of the Toronto warehouses. If one will look carefully enough he will see that the word "Sold" has been written on them. There are places where that same word could have been written three or four times, and as a matter of fact, in several cases they have been sold twice.

The automobile business is buying a lot of machinery in Ontario. This industry has been by long odds the best purchaser on the market for a good many months.

There is danger that the effects of the strikes in this country are going to be felt still in some places. Moulders are out of some shops yet, and in others work has been turned to other channels. There is, it is safe to say, a scarcity of tool room capacity in this province at the present time. Not that there may not be tool rooms that could take on more work, but we refer here to the capacity to handle the special tool, jig and fixture work of a fairly large concern. Machine salesmen are anxious, naturally, to hold as much of this sort of work on this side of the line as possible, but are finding it difficult in some cases to do so.

There is a tendency on the part of some concerns to hold back to see if there is going to be any limit to the things that are being asked for by some of the strikers. For instance, many of the Detroit metal workers are going to ask for $1 per hour, and the same feeling may grow in the Canadian territory across the river from that centre. These jumps now, coming on the top of a long list of things that drive costs up, are not going to help the placing of business.

Machine tool builders find that labor efficiency is not improving in many instances. They claim that increases in wages have been much larger than increases in efficiency or production. Of course, it is impossible each time that an increase in wages is given to have it accompanied by an increase in production, as such a thing may be physically impossible. Yet the fact remains that the increases in wages have far outstripped the increases in production. That has brought costs to a high plane, and they are there to stay for some time.

For the most part the machinery that is being sold now is new stuff, direct from the shops. By this, it is not meant that the used machine has departed from the market, but the war shop bogey has become a thing not to be afraid of any more.

How About the Strike?

The strike in the steel industry in United States will be felt in this country if the production is curtailed. It should make a good demand for material that can be produced by the Canadian mills. Of course, it is hard to tell for a few days just how effective the strike may be. Steel making is such a continuous process that there are several ways in which the whole works can be tied up. But the selling offices of the United States Steel Corporation have nothing to say about the situation, and it would be thought, were conditions serious, that they would be less sure of future deliveries. Only in one or two orders so far this week have they held back. Most of the business that passes from Canada to U. S. mills is straight mill, not warehouse business, and in this way the effect of the strike, were it serious enough to affect production, would be felt almost at once here. Warehouses carry a general stock, but much of the stuff that Canadians want from the U. S. steel mills is special material, rolled to order, and not taken from warehouses. Not only so, but the warehouse prices are so much higher than mill as to make too great a difference, unless there is real urgency in the job, and a chance to recover the difference between warehouse and mill prices from the customer.

POINTS IN WEEK'S MARKETING NOTES

The steel strike is going to have an effect on the Canadian market, though just how soon or how marked it is hard to say. Some warehouse stocks are fairly well filled up, but most of the business is direct from mills to users, on account of price.

—

The movement in structurals is particularly marked at present. Some contracts as high as a thousand tons are being figured on.

—

Machine tool dealers report business as being excellent, sales being of new tools with a decrease in the request for used machinery.

—

Capacity for handling tool room work on a large scale is not easy to find in this district.

—

Firms selling steel from U. S. mills were taking on business as usual this week, subject to the usual strike and other contingency provisions.

STRIKE IN STEEL MILLS FLATTENS OUT THE MACHINE TOOL PROSPECTS

Special to CANADIAN MACHINERY

NEW YORK, Sept. 25.—The expectation of a [illegible] has had the effect of [illegible] for machine tools to the minimum. With the exception of scattered orders for single tools or lots of two or three, there is very little in the market, so far as domestic trade is concerned. As for export, the European countries are barred from buying here on favorable terms by the exchange situation, and until there is a more even balance of exchange it is impossible to expect that any very important buying for shipment to Europe will develop. One exception to this is noted in the case of a concern in Switzerland which is placing orders here against a list of tools required for the manufacture of electric motors in that country. Purchases will total about $250,000, and a part of this business has already been booked.

American exporters of machine tools hear more of German competition in some of the European countries. For example, Sweden needs large numbers of machine tools, but a good share of the business probably will go to Germany. That country is quoting prices that are 50 or 60 per cent. lower than American prices, irrespective of the exchange.

The principal domestic buyers of tools in the East are the Gillespie Motors Corporation, Paterson, N.J., and the E. W. Bliss Co., Brooklyn.

THE I.W.W. CAST-OFFS ARE SAID TO BE BEHIND THE STEEL STRIKE

Special to CANADIAN MACHINERY.

PITTSBURGH, Pa., September 23.—At this writing it is quite impossible to gauge the extent or make any attempt to estimate the duration of the strike in the iron and steel industry. The matter rests not so much upon the proportion of men going on strike at the outset as upon whether the movement gains or loses as the days pass. An important fact is that it is much easier to induce a man not to work than to induce him to work. If he attempts to go to work the strikers can fine him and employ the familiar methods of intimidation. If he stays away from work those who want to work are quite certain not to hunt him up and threaten him if he does not work. Undoubtedly the strike leaders depend much upon mob psychology to carry their point. Nor can the amount of idleness in the iron and steel industry be measured by the proportion of men who strike, first because a few strikers may close a plant because it cannot operate with a certain department idle, and second, because there are such ramifications between plants. A strike tying up the lake vessels that carry iron ore would not affect the blast furnaces, as nearly all the season's ore has been moved, the full movement of one navigation season being sufficient to carry the furnaces into May or June the following year. Of the many cases in the opposite direction one may be cited. The foundries making ingot moulds for the steel works use [illegible] blast furnace (no cupolas), and if the steel works close they do not need ingot moulds. Accordingly, the ingot mould foundry [illegible] bank and the blast furnace suspends shipments of coke whereby coke ovens are made idle. At the other end of the chain there may be a rolling mill which uses purchased [illegible] ready to work [illegible] small, hence, eventually the finishing mill would have to close if the steel producing mill closed. Thus the closing simply of steel producing plants would close coke works at one end of the chain and finishing mills producing merchant bars, sheets, tin plate, etc., at the other end of the chain

Who are the Strikers?

Just who the strikers are is well defined. William Z. Foster, secretary-treasurer of the general organizing committee, and the leader in the Pittsburgh district; Fitzpatrick, the chairman, being in Chicago, was formerly an I.W.W. man and left the organization years ago upon being defeated in his aspiration to be editor of Solidarity, the I.W.W. official publication, joining the A. F. of L. with the statement that he intended to "bore from within." A pamphlet he wrote years ago, advocating the most lawless methods, is now being circulated to show his real character, which undoubtedly has not changed. Even as to the "24 unions" which the organizing committee was formed to represent, there is not unanimity. The officials made an effort to conceal the fact that the session occupying Wednesday and Thursday of [illegible] for the purpose of discussing whether the strike order should be recalled in view of the White House conference on labor, scheduled for Oct. 6, asserting that the subject was not being [illegible] was much discussion of that subject, and in the letter the organizers sent to President Wilson the statement is made that they carefully considered for two days the matter of calling off the strike.

Just how many of the 24 unions were in favor of postponement is not known, [illegible] ference adjourned, one of the unions, the International Union of Steam and Operating Engineers, sent an order to all its locals, saying that the officials were in favor of awaiting the result of the labor conference of October 6, and saying "all members are instructed to refrain from affiliating themselves in any way with the proposed strike." There may be several unions, anything short of a majority of the 24, to take similar action. As to the American Federation of Labor itself, its position is not clear. The strike is by individual unions handed together, not by the federation itself, and it is generally believed that Samual Gompers, president of the federation, is opposed to the strike.

Is There a Strike Fund?

As to funds, it does not appear that there is any large strike fund. Foster made a curious statement more than a week ago, to the effect that strike benefits would be paid to strikers who had not joined as well as to those who had. Joining, at least in the case of a large part of the common labor taken in, consisted in the joiner paying $3, of which the organizer received $2 as payment for his work. Unions like the boiler makers, machinists, etc., may have much money, and as the great bulk of their membership is outside the steel industry, they can raise funds, but it is quite improbable that any of the funds would be diverted to payment of strike benefits to men not members of their respective crafts.

Considering all the information now available practically all the chances are that the strike will either fail shortly or will develop into an I.W.W. or Bolshevist movement. A regularly conducted strike such as union men usually plan to have seems entirely improbable.

A fortnight or more ago it was a common idea among iron and steel producers that if there was any prospect of trouble at any particular plant, that plant should be closed at once so as to "beat the men to it." This idea was abandoned a week or so ago by almost all the producers, through their concluding that it was improper to take the risk of closing a plant that might otherwise have been able to run, as public sentiment might be adverse. A few plants in the Pittsburgh district were closed before the end of last week. In the case of the two at Brackenridge the officials made a statement that the closing was for the purpose of giving the men opportunity to hold [illegible] Saturday to decide whether or not they desired to strike.

Stocks Are Normal

Jobbers and manufacturing consumers of steel have approximately their normal stocks, and much larger stocks than they had last April and May, when buyers of steel had no confidence in the future of prices and were conducting business on a strictly hand to mouth basis. Normal stocks, however, are not large stocks, except in the case of a few manufacturing industries like the automobile industry. While jobbers' stocks could last for several weeks in fair

shape, and for longer periods in broken condition, they would last but a very short time should consumers who ordinarily draw supplies from mills turn to jobbers instead. This, however, is quite improbable, as the cost would be too high. Moreover, it was understood several days ago that many jobbers had already planned to advance prices promptly in the event of any scarcity developing, so as to make as much money as possible out of their position. As this might be regarded as "profiteering," many jobbers may refrain from advancing prices in the event of a scarcity.

The Strike Report

A rough guess would be that one-third of the iron and steel industry of the United States is idle on account of the strike. In some cases there are men willing to work, but the department is unable to run on account of other departments being on strike. The Chicago district is largely closed; the Wheeling district is practically altogether closed, or will be within a day or two. The Youngstown district is three-fourths closed, and the Pittsburgh district, including the Monongahela Valley, is operating almost full. Various detached plants are but little affected. Steel officials are strongly of the opinion that if the Monongahela Valley can be kept operating as well as at present, the men now on strike in other districts will return to work. The Carnegie Steel Co. has twenty-seven blast furnaces in the Monongahela Valley, of which twenty-two were operating and eleven are now banked, the other eleven being in full operation. At the steel works at these same points the operations are very good, as Duquesne is operating one hundred per cent., Edgar Thompson is operating practically full, and Homestead nearly full. The strike is confined entirely to the foreign-born labor. Officials of the steel companies state that the strike situation is somewhat better than they expected, and while they regard it as premature to predict that the strike will play out in a week or two, they have strong hopes in that direction.

BUYERS NOT LIKELY TO BOOK VERY HEAVY ON QUOTATIONS GIVEN FOR 1920

Stocks are still being depleted, and iron for 1920 is not very easy to get. In these circumstances advances are to be had for the asking. Foundry iron is the principal demand. Following are reports from U. S. points:

Cleveland.—Although 1920 business is not being sought after, some orders have been placed. One for 5,000 tons was accepted at the $26.75 furnace base.

Foundry iron for this year's delivery is hard to get, and furnaces are making sales at points far distant from their natural selling zone. Steel making sales are quiet. Stocks are being lowered by continued heavy shipments.

Boston:—Selling here has been confined to small tonnages, and with one notable exception, 1920 iron is quoted at an advance of $1 on present prices. The exception is a Buffalo furnace, which is offering 1920 iron at $29 for 2X eastern. Some large orders are expected to materialize in the near future, but 300 ton lots represent the largest sales just now.

New York.—There have been small sales to local foundries which find they require additional tonnage to fill their orders. Business generally is in small lots of foundry grades, which have reached a fair aggregate. One order for 10,000 tons, about equally divided between this year and next, was placed at full price.

Philadelphia.—The market is quiet, with both sides holding off. The rate quoted for No. 2X is $31, delivered, although where rates are favorable $30 has been mentioned. Steel making grades, as well as low phosphorus iron are dead, while charcoal iron producers are booked up and out of the market for this year.

Pittsburgh.—General dullness marks the trading here, and what little demand there is in evidence is for foundry iron. Prices for next year delivery are being quoted at a rate which is plainly meant to discourage the buyer. Steel making grades are dull, and while prices are holding up nominally, purchases are said to have been made at 50 cents below the quoted rate. The demand from automobile makers for deliveries has stimulated this market.

Buffalo:—Sales for 1920 are still small, as the labor situation is still a cause for uneasiness. Some small tonnages have been accepted at small advances. The demand for foundry iron is increasing.

Chicago.—A fairly large tonnage has been sold here for next year delivery. No. 2 foundry is being quoted at $26.75, with $1 added to the usual silicon differentials above $2.25%. There is a good enquiry from a few users for malleable and foundry, but there is no sign of a general demand. Enquiries are for lots of 500 to 5,000 tons.

Cincinnati.—Business in the south is exceedingly light, with furnaces showing no disposition to get after new year business. Jackson Co. furnaces are still idle. Virginia iron is quoted at $30, furnace, with not much iron offering.

St. Louis.—There is a good business being done in small lots of pig iron, and the outlook is good. Most of the business is for immediate shipment, or not later than October, and prices are firm. Freight car shortage is still a factor, deliveries on contracts being much delayed.

Birmingham.—Brisk sales and increased prices are the conditions here. Car shortage is helping to keep deliveries back, and in addition to this, production is falling short of sales. 1.75 to 2.25 silicon iron has sold at $27.50 and $27.-75, furnace. A new schedule of silicon differentials quoted by one maker adds 4c% to the prices for each half of 1% above 2.25.

SUDDEN DEATH OF W. C. GURNEY

Prominent Toronto Business Man—President and General Manager Gurney Foundry Co., Ltd.

W. Cromwell Gurney, president and general manager of the Gurney Foundry Co., Ltd., collapsed suddenly while visiting the office of his physician for routine treatment. In spite of the efforts

The late W. C. GURNEY.

of two other physicians present, resuscitation was impossible, and Mr. Gurney passed away from heart failure.

Earlier in the year Mr. Gurney suffered from influenza, from which he had not made a complete recovery. The sudden death of his mother only recently affected him profoundly, and since that tragic event he had been upset and unlike himself. The news of his death came with shocking suddenness.

Mr. Gurney, who was in his 46th year, was the son of the late Edward Gurney, whom he succeeded as president of the firm upon the latter's death a few years ago. He was educated at Upper Canada College, and then entered the Gurney Foundry Co. He was a member of the National Club, Lambton Golf Club, the Canadian Manufacturers' Association, the Board of Trade, and was one of the best-known of Toronto's business men.

CORRECTION

In the leading article of last week's CANADIAN MACHINERY on "Tractor Ploughing Machine of Unique Design," there is an error appearing in the closing paragraph. It states that the machine is capable of ploughing an acre an hour. This should read—three acres an hour, or 30 acres in 10 hours.

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON

Grey forge, Pittsburgh	$27 15
Lake Superior, charcoal, Chicago	34 60
Standard low phos., Philadelphia	....
Bessemer, Pittsburgh	29 35
Basic, Valley furnace	25 75
Toronto price:—	
Silicon..2.25% to 2.75%	$32.75 to $35.75

IRON AND STEEL

Per lb. to Large Buyers	Cents
Iron bars, base, Toronto	$ 4 25
Steel bars, base, Toronto	4 25
Steel bars, 2 in. to 4 in. base	5 50
Steel bars, 4 in. and larger base	6 00
Iron bars, base, Montreal	3 75
Steel bars, base, Montreal	3 75
Reinforcing bars, base	4 50
Steel hoops	5 50
Norway iron	11 00
Tire steel	5 50
Spring steel	8 00
Brand steel, No. 10 gauge, base	4 40
Chequered floor plate, 3-16 in.	6 50
Chequered floor plate, ¼ in.	6 25
Staybolt iron	8 00
Bessemer rails, heavy, at mill	....
Steel bars, Pittsburgh	2 35
Tank plates, Pittsburgh	2 65
Structural shapes, Pittsburgh	2 45
Steel hoops, Pittsburgh	3 05
F.O.B., Toronto Warehouse	
Small sapes	4 25
F.O.B. Chicago Warehouse	
Steel bars	3 62
Structural shapes	3 72
Plates	3 90
Small shapes under 3"	3 62

FREIGHT RATES

	Per 100 pounds C.L.	L.C.L.
Pittsburgh to Following Points		
Montreal	33	45
St. John, N.B.	41½	55
Halifax	49	64½
Toronto	27	39
Guelph	27	39
London	27	39
Windsor	27	39
Winnipeg	89½	135

METALS

	Gross	
Lake copper	$26 50	$26 25
Electro copper	25 50	26 00
Castings copper	25 50	25 00
Tin	60 00	58 00
Spelter	9 75	10 00
Lead	7 25	7 00
Antimony	10 00	10 50
Aluminum	35 00	35 00

Prices per 100 lbs.

PLATES

	Montreal	Toronto
Plates, ½ up	$ 4 50	$ 4 50
Plates, 3-16 in.	4 90	4 90

Price List No. 38

WROUGHT PIPES

Standard Buttweld

⅛ in.	3 65	5 81
¼ in.	4 68	5 81
⅜ in.	4 68	5 81
½ in.	5 85	7 48
¾ in.	7 80	9 95
1 in.	12 48	14 79
1¼ in.	18 72	22 90
1½ in.	23 79	29 76
2 in.	33 16	41 01
2½ in.	49 97	61 75
3 in.	74 79	93 24
3½ in.	97 16	84 18
4 in.	79 57	99 74

Standard Lapweld

2 in.	38 81	35 34
2½ in.	42 12	52 36
3 in.	55 08	68 47
3½ in.	69 00	86 94
4 in.	81 75	103 00
4½ in.	93	1 18
5 in.	1 08	1 37
6 in.	1 40	1 78
7 in.	1 83	2 32
8L in.	1 93	2 44
8 in.	2 22	2 81
9 in.	2 66	3 36
10L in.	2 46	3 12
10 in.	3 17	4 02

Terms 2% 30 days, approved credit.

Freight equalized on Chatham, Guelph, Hamilton, London, Montreal, Toronto, Welland.

Prices—Ontario, Quebec and Maritime Provinces

WROUGHT NIPPLES

4" and under, 60%.
4½" and larger 50%.
4" and under, running thread, 30%.
Standard couplings, 4" and under, 40%, 4½" and larger, 20%.

OLD MATERIAL

Dealers' Buying Prices.

	Per 100 Pounds. Montreal	Toronto
Copper, light	$15 00	$13 75
Copper, crucible	18 00	18 00
Copper, heavy	18 00	18 00
Copper wire	18 00	18 00
No. 1 machine composition	16 50	16 75
New brass cuttings	13 00	10 75
Red brass cuttings	14 50	14 75
Yellow brass turnings	9 00	9 00
Light brass	7 50	7 00
Medium brass	9 00	7 75
Scrap zinc	6 00	6 00
Heavy lead	5 00	5 25
Tea lead	3 75	3 50
Aluminum	18 00	18 00
	Per Ton	Net
Heavy melting steel	13 50	13 50
Shell turnings	7 00	6 00
Boiler plate	13 50	11 00
Axles (wrought iron)	20 00	20 00
Rails	14 50	13 50
Malleable scrap	15 00	17 00
No. 1 machine cast iron	20 00	18 00
Pipe, wrought	10 00	5 00
Car wheels	20 00	20 00
Steel axles	20 00	20 00
Mach. shop turnings	6 00	6 00
Stove plate	15 00	13 00
Cast iron	7 00	8 00

BOLTS, NUTS AND SCREWS

	Per Cent.
Carriage bolts, ⅜" and less	35
Carriage bolts, 7-16 and up	15
Coach and lag screws	50
Stove bolts	65
Tire bolts	50
Patch bolts	25
Machine bolts, 7-16 and over	40
Machine bolts, ⅜ and less	40
Blank bolts	25
Nuts, ⅜ and rd. hd.	25
Nuts, hex.	27½
Machine screws, o. and fil. hd., steel	10
Machine screws, fl. and rd. hd., brass	net
Machine screws, o. and fil. hd., brass	net
Nuts, square blank	add $0 75
Nuts, square, tapped	add 1 00
Nuts, hex., blank	add 1 00
Nuts, hex., tapped	add 1 25
Copper rivets and burrs, list less	15
Burrs only, list plus	25
Iron rivets and burrs	40 and 5
Boiler rivets, base ¾" and larger	$8 50
Structural rivets, as above	8 40
Wood screws, O. & R., bright	75
Wood screws, flat, bright	77½
Wood screws, flat, brass	55
Wood screws, O. & R., brass	55½
Wood screws, flat, bronze	50
Wood screws, O. & R., bronze	47½

MILLED PRODUCTS

(Prices on unbroken packages)

	Per Cent.
Set screws	50
Sq. and Hex. Head Cap Screws	45
Rd. and Fil. Head Cap Screws	20
Flat But. Hd. Cap Screws	10
Fin. and Semi-fin. nuts up to 1 in.	45
Fin. and Semi-fin. nuts, over 1 in., up to 1½ in.	40
Fin. and Semi-fin. nuts over 1½ in., up to 2 in.	25
Studs	30
Taper pins	50
Coupling bolts	10
Planer head bolts, without fillet, list	10
Planer head bolts, with fillet, list plus 10 and	net
Planer head bolt nuts, same as finished nuts.	
Planer bolt washers	net
Hollow set screws	net
Collar screws	list plus 20, 30
Thumb screws	40
Thumb nuts	75
Patch bolts	add 20
Cold pressed nuts to 1½ in.	add $1 00
Cold pressed nuts over 1½ in.	add 2 00

BILLETS

	Per gross ton
Bessemer billets	$38 50
Open-hearth billets	38 50
O.H. sheet bars	42 00
Forging billets	51 00
Wire rods	52 00

Government prices.
F.O.B. Pittsburgh.

NAILS AND SPIKES

Wire nails	$4 70
Cut nails	4 75
Miscellaneous wire nails	60%
Spikes, ⅝ in. and larger	$7 50
Spikes, ¼ and 5-16 in.	8 00

ROPE AND PACKINGS

Drilling cables, Manila	0 39
Plumbers' oakum, per lb.	0 10
Packing, square braided	0 38
Packing, No. 1 Italian	0 44
Packing, No. 2 Italian	0 36
Pure Manila rope	0 37
British Manila rope	0 31
New Zealand hemp	0 31
Transmission rope, Manila	0 43
Cotton rope, ¼-lb. and up	0 74

POLISHED DRILL ROD

Discount off list, Montreal and Toronto ..... net

MISCELLANEOUS

Solder, strictly	$ 0 34
Solder, guaranteed	0 39
Babbitt metal	18 to 70
Soldering coppers, lb.	0 58
Lead wool, per lb.	0 14
Putty, 100-lb. drums	6 75
White lead, pure, cwt.	17 80
Red dry lead, 100-lb. kegs, per cwt.	15 50
Glue, English	0 35
Tarred slater's paper, roll	1 30
Gasoline, per gal., bulk	0 33
Benzine, per gal., bulk	0 32
Pure turpentine, single bbls., gal.	1 50
Linseed oil, raw, single bbls.	2 90
Linseed oil, boiled, single bbls.	2 92
Plaster Paris, per bbl.	4 50
Sandpaper, B. & A.	List plus 43
Emery cloth	List plus 37½
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 07
Rosin "G," per lb.	0 08
Borax crystal and granular	0 14
Wood alcohol, per gallon	2 00
Whiting, plain, per 100 lbs.	2 50

CARBON DRILLS AND REAMERS

S.S. drills, wire sizes up to 52	40
S.S. drills, wire sizes, No. 53 to 80	50
Standard drills, all sizes	50
3-fluted drills, plus	10
Jobbers' and letter sizes	50
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	50
Sleeves	50
Taper pin reamers	net
Drills and countersinks	list plus 10
Bridge reamers	50
Centre reamers	10
Chucking reamers	net
Hand reamers	10
High speed drills, list plus 10 to	40
Canadian high speed cutters	net
American	plus 40

COLD ROLLED SHAFTING

At mill ..... list plus 5%
At warehouse ..... list plus 25%
Discounts off new list. Warehouse price at Montreal and Toronto

IRON PIPE FITTINGS

Malleable fittings, class A, 20% on list; class B and C, net list. Cast iron fittings, 15% off list. Malleable bushings, 25 and 7½%; cast bushings, 25%; unions, 45%; plugs, 20% off list. Net prices malleable fittings; class B black, 24½c lb.; class C black, 15¾c lb.; galvanized, class B, 34c lb.; class C, 24½c lb. F.O.B. Toronto.

SHEETS

	Montreal	Toronto
Sheets, black, No. 28	$ 6 55	$ 6 00
Sheets, black, No. 10	5 15	5 45
Canada plates, dull, 52 sheets	8 50	7 10
Can. plates, all bright	8 50	8 00
Apollo brand, 10¾ oz. galvanized	....	....
Queen's Head, 28 B.W.G.	....	....
Fleur-de-Lis, 28 B.W.G.	....	....
Gorbal's Best, No. 28	....	....
Colborne Crown, No. 28	....	....
Premier, No. 28 U.S.	....	7 50
Premier, 10¾ oz.	....	7 80
Zinc sheets	20 00	20 00

PROOF COIL CHAIN

(Warehouse Price)

B

¼ in., $13.50; 5-16, $11.50; ⅜ in., $10.50; 7-16 in., $9.30; ½ in., $10.15; $13.00; ⅝ in., $9.60; ¾ in., $9.70; ⅞ in., $9.95; 1 in., $9.50; Extra for B.B. Chain, $1.20; Extra for B.B.B. Chain, $1.80.

ELECTRIC WELD COIL CHAIN B.B.

⅛ in., $16.75; 3-16 in., $15.40; ¼ in., $14.20; 5-16 in., $11.50; ⅜ in., $10.50; 7-16 in., $9.30; ½ in., $10.50; ⅝ in., $10.00; ¾ in., $9.70.

Prices per 100 lbs.

FILES AND RASPS

	Per Cent
Globe	50
Vulcan	50
P.H. and Imperial	50
Nicholson	32½
Black Diamond	27½
J. Barton Smith, Eagle	50
McClelland, Globe	50
Delta Files	20
Disston	40
Whitman & Barnes	50
Great Western-American	50
Kearney & Foot, Arcade	50

BOILER TUBES.

Size	Seamless	Lapwelded
1 in.	$25 00	$.....
1¼ in.	27 00	.....
1½ in.	28 00	26 00
1¾ in.	30 00	26 00
2 in.	30 00	26 00
2¼ in.	33 00	28 00
2½ in.	40 00	32 00
3 in.	46 00	38 00
3¼ in.	.....	45 00
3½ in.	56 00	42 00
4 in.	70 00	54 00

Prices per 100 ft., Montreal and Toronto

OILS AND COMPOUNDS.

Castor oil, per lb.	
Royalite, per gal., bulk	22½
Palacine	25½
Machine oil, per gal.	36
Black oil, per gal.	16
Cylinder oil, Capital	62
Cylinder oil, Acme	45
Standard cutting compound, per lb.	0 06
Lard oil, per gal.	$2 60
Union thread cutting oil, antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil, bbls. net	8

BELTING—No 1 OAK TANNED

Extra heavy, single and double	30%
Standard	30, 10%
Cut leather lacing, No. 1	2 20
Leather in sides	1 75

TAPES

Chesterman Metallic, 50 ft.	$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

PLATING SUPPLIES

Polishing wheels, felt	4 00
Polishing wheels, bull-neck	2 25
Emery in kegs, American	06
Pumice, ground	06
Emery glue	35
Tripoli composition	09
Crocus composition	12
Emery composition	10
Rouge, silver	50
Rouge, powder, nickel	45

Prices per lb.

ARTIFICIAL CORUNDUM

Grits, 6 to 70 inclusive	.08¼
Grits, 80 and finer	.6

BRASS—Warehouse Price

Brass rods, base ½ in. to 1 in. rod	0 34
Brass sheets, 24 gauge and heavier, base	$0 42
Brass tubing, seamless	0 46
Copper tubing, seamless	0 48

WASTE

XXX Extra	19½	Atlas	17
Peerless	19	X Empire	15½
Grand	18	Ideal	16
Superior	18	X Press	14
X L C R	17		

Colored

Lion	15	Popular	12
Standard	13½	Keen	10½
No. 1	13½		

Wool Packing

Arrow	25	Anvil	15
Axle	20	Anchor	11

Washed Wipers

Select White	11	Dark colored	09
Mixed colored	10		

This list subject to trade discount for quantity.

RUBBER BELTING

Standard ... 10% Best grades ... 15%

ANODES

Nickel	.58 to .65
Copper	.38 to .45
Tin	.70 to .70
Zinc	.18 to .18

Prices per lb.

COPPER PRODUCTS

	Montreal	Toronto
Bars, ½ to 2 in.	$42 50	$43 00
Copper wire, list plus 10		
Plain sheets, 14 oz., 14x60 in.	46 00	44 00
Copper sheet, tinned, 14x60, 14 oz.	48 00	48 00
Copper sheet, planished, 16 oz. base	46 00	45 00
Braziers', in sheets, 6 x 4 base	45 00	44 00

LEAD SHEETS

	Montreal	Toronto
Sheets, 3 lbs. sq. ft.	$10 25	$11 50
Sheets, 3½ lbs. sq. ft.	10 00	11 00
Sheets, 4 to 6 lbs. sq. ft.	9 75	10 50

Cut sheets, ½c per lb. extra.
Cut sheets to size, 1c per lb. extra.

PLATING CHEMICALS

Acid, boracic	$ .25
Acid, yhdrochloric	.04
Acid, nitric	.10
Acid, sulphuric	.04
Ammonia, aqua	.13
Ammonium, carbonate	.20
Ammonium, chloride	.22
Ammonium hydrosulpuret	.50
Ammonium sulphate	.30
Arsenic, white	.14
Copper, carbonate, annhy	.41
Copper, sulphate	.16
Cobalt, sulphate	.20
Iron perchloride	.62
Lead acetate	.30
Nickel ammonium sulpate	.16
Nickel carbonate	.32
Nickel sulpate	.18½
Potassium carbonate	.50
Potassium sulphide (substitute)	.42
Silver chloride (per oz.)	1.25
Silver nitrate (per oz.)	1.20
Sodium bisulphate	.18
Sodium carbonate crystals	.06
Sodium cyanide, 127-130%	.38
Sodium hyposulphite per 100 lbs	8.00
Sodium phosphate	.18
Tin chloride	1.75
Zinc chloride, C.P.	.30
Zinc sulphate	.08

Prices per lb. unless otherwise stated

STEEL STRIKE HAS PUT SHIVERS IN THE U.S. SCRAP METAL TRADE

The market is dull and unsettled all over the country. The uncertainty due to the threats of the steel strike is causing a waiting attitude on the part of buyers. Following are reports from various U. S. points:

Chicago.—There is very little scrap being sold, and prices are softening. Dealers are inclined to hold their stocks as they feel that the market has intrinsic strength, which will develop after the labor situation is more settled. Railroad offerings are small, aggregating about 5,000 tons.

Boston.—The market has been marked by unsteadiness during the week. Prices are off, heavy melting steel having been sold at $15. Several lots of Government scrap were withdrawn owing to the low prices offered. Malleable scrap was bought at $21, delivered.

New York.—The best demand is for cast scrap, but even in this grade the business is small. In spite of this there is a firm tone to prices. The fact of Government offers being withdrawn till better offers are forthcoming has had a good effect in keeping up prices.

Philadelphia.—Machine shop and blast furnace turnings, and the lighter grades have been in good demand, and prices have advanced somewhat. The demand for heavy melting steel has been very small. The Ordnance offer approximately 6,000 tons of forgings at various locations.

Pittsburgh.—The demand for cast iron scrap is good here, and has resulted in advances of from 50 cents to $1 in these grades. Malleable is also a strong grade, demands being ahead of offerings. Heavy melting can be got at $21 delivered at Pittsburgh, and prices show a tendency to weaken further.

Buffalo.—Melters are busy, and the demand for scrap is accordingly stronger, some fair tonnages having been sold. Borings and heavy axle turnings are also in request.

Cleveland.—The labor situation is influencing consumers, who are waiting developments. The scrap market is very dull, and this condition is looked for for some time, transactions even among dealers being few few. A sale of 50,000 tons of heavy melting steel at $21.50 to a large consumer is reported.

Cincinnati.—There is little demand, and the market is weak. While foundry scrap prices are holding their own, steel mill scrap is weak. The car shortage is still being felt.

St. Louis.—There have been some backward movements of scrap prices during the week, but foundry scrap is in good demand. Railroads are offering 4,000 tons, and the Ordnance about 7,000 tons at two different plants.

Birmigham.—There is a better demand for iron and steel scrap, and prices are holding firm. It is probable that there may be an advance shortly, as business for the last quarter is expected to be brisk.

MONTREAL NOTES

Lawrence Russell, vice-president and general manager of the Armstrong, Whitworth of Canada, Limited, will leave on a business trip to England about the first of October. He will be away about six or eight weeks, and during his absence his work will be temporarily taken over by Herbert Johnson.

* * *

D. F. Glass, who has been secretary-treasurer for the Montreal branch of the Navy League of Canada for the past two years, will shortly resign from this position to accept an executive position with the Ocean Accident and Guarantee Corporation, Limited, with headquarters in Toronto. His new duties will be taken up about the first of December.

* * *

In view of the increasing number of tourists coming to Montreal, the Canadian Pacific Railway Company are contemplating the rebuilding of the Place Viger Hotel. The proposed change will transfer the station hotel into a building of ten storeys. During the past summer the city has been taxed in accommodating the travelling public, and many visitors have had to seek accommodation in private houses.

It is the opinion of the officials of the Montreal Harbor Commissioners that the proposed damming of the River St. Lawrence, at Morrisburg and Long Sault, will be of enormous benefit to navigation and power development. The level of the water in the Montreal harbor will be more uniform throughout the year and the danger of floods would be practically eliminated. There is frequently a variation in water level of from 10 to 16 feet, between the spring and the fall.

* * *

Plans are now under way for the construction of a large arena in the City of Montreal, which will have a seating capacity of 6,000. While the idea is primarily one for skating and hockey purposes, arrangements are being made for interchange on summer attractions and other amusements. Plans have been prepared by Chas. M. Mitchell, architect, of Montreal, and the building will be built of wood, concrete, brick and steel. The front of the building is to be in the form of an apartment house, with the arena in the rear. Every modern convenience will be provided. The company will operate under the name of the National Sporting Club, Ltd., which is now in process of incorporation.

The Standard Equipment and Tool Works have opened an office at 179 St. James St., Montreal, for the purpose of buying and selling of all classes of machinery. They are prepared to purchase metal and woodworking machine tools, as well as contractors' and mining equipment. All machinery will be carefully inspected, repaired or rebuilt, as found necessary, before reselling to the trade. They are in the market to receive offers of entire plants which owners are disposed to sell. Joseph Presner, M.E., is managing director of the company. He was 12 years with Robt. W. Hunt and Co., the last six being spent in executive work in many of the principal offices of the company. He traveled considerably, appraising and inspecting plants and machinery in many cities throughout the United States and Canada.

BIG CONVENTION OF FOUNDRYMEN

Launching to be One of the Events for Those Who Attend Philadelphia Gathering

In recognition of and to commemorate the twenty-fourth annual convention of the American Foundrymen's Association, to be held in Philadelphia during the week of September 29, the International Shipbuilding Corporation has arranged to launch a ship at the Hog Island yard on Tuesday afternoon, September 30. This ship will be named "Afoundria" in honor of the American Foundrymen's Association and the great industry which this organization represents. The "Afoundria" will be christened by Mrs. A. O. Backert, wife of the president of the association.

The launching of the "Afoundria" at the Hog Island Shipyard will be one of the features of the boat ride on the Delaware River Tuesday afternoon, September 30. The boat will leave the Chestnut Street wharf at 1.30 p.m. The name of the ship "Afoundria" was coined from the first letters of the name of the association, namely, A. F. A. and the word foundry.

A Busy Shop.—The Electric Steel and Metals, Ltd., Welland, manufacturers of steel castings, report good business. They have recently installed new cleaning equipment, large core ovens, and sand-blasting machinery. Additions made to building during the war have thus been converted to good purpose.

Welland.—The British American Shipbuilding Co., Welland, are completing their last cargo boat on Munition Board account, and expect to deliver by the end of September. They will then proceed with two 320-foot cargo boats for the Department of Marine and Fisheries. These boats are over canal size and will be taken to Montreal in sections.

MORE ORDERS FOR THE PACIFIC YARDS

Twelve More May be Put Under Way There For Speedy Construction

According to a despatch from Vancouver the construction of twelve more steel ships in Vancouver yards may result from a conference which opened between Mr. Charles J. Fisher, of Seattle, and representatives of local builders.

Mr. Fisher has been instructed by his principals in New York to, if possible, conclude negotiations with Vancouver interests for the undertaking of a programme of constructions which may extend into 1921.

Ships similar to those recently turned out by the Coughlan yards are sought and the division of the work planned would be fifty-fifty as between the Wallace and Coughlan yards, Mr. Fisher said this morning.

Like Government Ships

"Announcement as to the conclusion of negotiations must come from Coughlan's or Wallace's," said Mr. Fisher. "The work planned calls for ships of the same type as those being turned out at the Coughlan yards. There will be changes in certain details, such as the leaving out of equipment for wartime purposes.

"It is planned to begin the work within the next two months and it is expected that one ship per month should be turned out."

Mr. Fisher's contracts would total something like $15,000,000 and would mean increasing the complement of workmen at the local yards to twice the present number. The work would keep the yards busy until the first months of 1921.

Representatives of the local yards were not prepared to discuss Mr. Fisher's visit. Upon his arrival here he was met by Capt. S. F. Mackenzie of the North-Shore yards.

Long Negotiations

It is said that the Seattle man represents Norwegian interests. He has been negotiating with Vancouver shipbuilders for six weeks past. His arrival this morning prepared to discuss the final phases of the business naturally created somewhat of a flurry.

In the event of the deal being closed contracts will be forwarded to New York for the signatures of certain of the contracting parties and Mr. Fisher says a week will probably elapse before announcement of their being signed, sealed and delivered could be officially made.

The South African Trade.—Mr. Egan, the Canadian trade commissioner to South Africa, is spending some time in this country and has been meeting many of the Canadian manufacturers with a view to explaining to them conditions in that country. There has been a report current that some Canadian firms had made a serious mistake in shipping too much to that market immediately on the signing of the armistice, while the freight rates were still very high, around the $60 mark, as against from $20 to $27 now. Mr. Egan, when asked about this, said that the situation had righted itself, and that now there was no glut in the market. Last year Canada had done with South Africa a business worth $3,704,000. The lines of goods needed in South Africa are covered pretty well in the Bulletin issued by the Intelligence Bureau, Department of the Trade and Commerce Department at Ottawa. The tractor is just getting a start in South Africa, and there should be a nice business there for a machine burning crude or coal oil. One thing is certain, and that is that if Canadian manufacturers want to get the best results from the service established by the Trade and Commerce Department they will have to co-operate. If a firm wants to know anything they should ask specific questions. This paper happens to know of one paint firm that sent word to the various trade commissioners, asking what were the prospects for them getting into the South African and Australian markets. Well, under the circumstances, all the trade commissioners could do was to send back word stating the amount of paint that had been sold and where it came from. Another paint maker sent out a list of twenty-five questions along with their color cards, analysis, prices, etc., and then asked the commissioners to answer the questions. It was possible to do so, and very satisfactory results were obtained from the field. There is an opening in the South African market for steel and iron, a fairly large amount of which is now sent in from the Canadian mills.

An Australian Visitor.—Mr. William Hoskin, of Wm. Hoskin & Sons, Sydney, Australia, engineers and jobbers, has been in this district for a few days, prior to leaving for Vancouver, from which port he will sail for home as soon as he can get passage. Trade conditions in his country are satisfactory, considering the manner in which trade conditions had been interrupted with on account of the war. "There should be a bigger opening for Canadian goods than has been made use of so far," stated Mr. Hoskins, to CANADIAN MACHINERY. "We would be pleased to get into touch with any of the Canadian makers of Canadian machinery or tools, who want to know more about the Australian field. It will be a long time yet before Australia will roll all the steel she needs, although good progress has been made in that direction, but it is not possible yet to get it out at a price." The scarcity of shipping tonnage piled up a tremendous amount of wheat in that country and now there are heaps of it waiting shipment. The feeling in Australia is favorable to Canada, but Canadians need more than catalogues to sell their goods. Mr. Hoskins claims that the best results are obtained by firms that have their goods on the field and their own men there to introduce them.

Representation in Australia.—Information in regard to this can be secured from the Intelligence Branch of the Trade and Commerce Department at Ottawa by mentioning No. 2201. A manufacturers' agent in Sydney, New South Wales, is in a position to represent reputable Canadian manufacturers in Australasia or New Zealand. He will make personal visits to Melbourne, Adelaide, Perth, Brisbane, Auckland, Wellington, Christchurch, and Dunedin each buying season (twice a year), and will have resident agents in each centre. He will only do business with wholesale firms, manufacturers and large retail shops, consequently the business is big. He would require to act as the selling agent and require the selling firm to quote always c.i.f. and e. Sydney, with 5 per cent. commission included for himself. Would cable all orders for confirmation and post contracts containing speculation of colors, designs, etc., accompanied with a letter of credit for the full amount of invoice from buyers that can be drawn by sellers at sight for two to four months when shipped. Firms must give a written guarantee that all shipments are equal to their samples. Three years' agreement with, if mutually agreeable, extension for a further three to five years' period.

POINT NOT SETTLED AT OTTAWA

Continued from page 328

representatives were represented with words, the so-called capitalists had almost a monopoly of the facts and statistics given to the assembly. Labor argued from what it had been able to force on capital in the past in Canada and other countries; capital presented the statistical position of the different industries, produced evidence to show what had followed the introduction of the minimum hour day in other countries, and the present position of industry in Canada. And labor listened with smiling tolerance.

Threats Were Few

Only in a few cases was the note of intolerance struck, and it was mainly in the case of some more or less notorious labor delegates such as James Winning, one of the leaders of the Winnipeg disturbance. There were threats of what would happen if the 44-hour week did not come; but mainly labor seemed to have a supreme confidence in its strength to secure its desires.

On the whole the conference should do good. It will be an expensive matter. With about two hundred delegates, with an expense allowance of $10 a day each, and an average of about ten days from the time they leave home until they return, the "indemnity" will run into a matter of close on to $25,000; but it will have been well spent if labor and capital can be brought to see each other's problems face to face, and to learn the necessity of give and take, and of increased production to help meet Canada's enormous commitments and debts.

J. M. F.

A Complete Line 8 in. to 50 in. Swing.
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Gang Drills

Accuracy—Strength
Convenience of Operation

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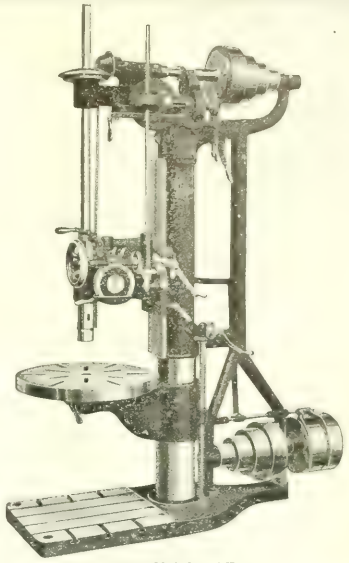

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"They Cut Faster and Wear Longer"

DRILLS FILES

MORROW NUTS MORROW

Interested readers will cut this page and place with letters to be answered.

INDUSTRIAL NEWS

NEW SHOPS, TENDERS AND CONTRACTS PERSONAL AND TRADE NOTES

OBITUARY

The death is announced from Nova Scotia of Mr. George Gray, assistant general manager of the Acadia Coal Co. Mr. Gray passed away at his home in Stellarton after a short illness. His connection with the Acadia Coal Company dates from 1883, when he started as a clerk in the office in Stellarton. He advanced step by step to his position as assistant general manager. He is survived by a widow and two sisters.

PERSONAL

Wm. E. Kelly, president and general manager of the Kelly Reamer Co., Cleveland, has retired from his position, his duties being turned over to J. M. Davie, assistant general manager.

It may interest your readers to know that Mr. E. G. Buckwell, secretary and manager of sales of the Cleveland Twist Drill Company, has just returned from a three months' visit to England and the continent, where he has made a thorough trade investigation in conjunction with the European branch of the Cleveland Twist Drill Company—Cleveland Twist Drill Company of Great Britain, Ltd., London.

Purchasing Agents Meet.—The Purchasing Agents' Association of Toronto held their monthly dinner meeting at the King Edward Hotel Wednesday evening. The dinner was largely attended and a very interesting address was given by Mr. J. R. K. Bristol, manager of the Tariff Department of the Canadian Manufacturers' Association, on "The Reason for a Tariff, the Recent Changes, and the Future Outlook," which allowed a great field for discussion. The members also enjoyed a musical programme. Mr. J. I. Nicholson, of Guns, Limited, and Mr. G. P. Biswick, of the Polson Iron Works, were elected delegates to the convention of the National Association of Purchasing Agents at Philadelphia, Pa., Sept. 22, 23 and 24.

Hercules Smart, formerly manager of the New York office of Illinois Tool Works, Chicago, has been appointed to succeed Mr. D. J. Rice as manager of the company's Detroit store.

TRADE GOSSIP

Rumored Big Concern.—It is being stated that an organization with a capital of $15,000,000, will be located in Toronto, to build locomotives.

Inducements to Industries.—The town of Deseronto is advertising its willingness to grant free sites and tax exemption to any industry locating in the city. Two large boards, containing the offer, will be erected at the railway entrances to the town.

Machine Industry Better.—From Galt comes the good news that the Canada Machinery Company employees are once more on full time. For a while the plant has been shut down Saturday all day, but the demand for wood-working machinery has so increased that full time is again necessary.

No Sign of Settlement.—The case of employees on the Welland ship canal has been taken out of the contractors' hands and is now under the jurisdiction of the Department of Railways and Canals. The men have sent a telegram to Tom Moore, President of the Dominion Federation of Labor, requesting him to get in touch with the minister, with a view to expediting matters.

Prescott to Get Coal Terminals.—The G.T.R. are said to be conducting negotiations with a view of erecting coal terminal facilities at Prescott. The project would necessitate the formation of a subsidiary company to operate a car ferry between Prescott and Ogdensburg. By this means coal that enters this country by way of Rouse's Point for Montreal and Ottawa Valley points, would be routed through Ogdensburg.

Lower Ocean Rates.—The greatly accelerated production of ocean shipping will undoubtedly soon have an effect on the rates for ocean-born freight. According to Lloyd's there are now 2,500,000 tons more steam vessel space than before the war. Another 10,000,000 tons is building, and the effect of this new cargo space on prevailing rates is sure to be in the way of reduction. In fact, some people prophesy a drop sharp enough to be termed a crash.

New Glasgow Strike Ends.—After a strike lasting less than a week, the men employed in the New Glasgow yards of the Nova Scotia Steel Co. returned to work. Some concessions were made by the company, but none of the specified demands have really been granted. The company guaranteed that on the completion of the two ships now on the stocks, a new 6,000-ton vessel will be laid down.

Good Trade Balance.—The figures for Canadian export and import trade for the month of August show up in a satisfactory manner. Exports for August, 1919, exceeded those for August, 1918, by $26,000,000, while imports for August show an increase over that month last year of only a little more than $1,000,000. Total exports for August amounted to $116,564,792, against $90,153,888, while imports amount to $81,357,485, as compared with $79,652,526.

Subsidies for Shipbuilding.—At the meeting of the Port Arthur Board of Trade a letter was read from Mr. J. F. Paige of the Port Arthur Shipbuilding Co. Mr. Paige asked for the endorsation of a petition to the Government asking for the granting of a subsidy of $10 a gross ton and $10 per indicated horse power to Canadian shipbuilders Mr. Paige said that there was $47,500,000 invested in Canadian yards, and the pay roll was $42,000,000, while the associated industries received wages amounting to $40.000,000.

Workman Sues Iron Company for $9,000.—R. Baltschunas, a former employee of the Canadian Tube and Iron Company, Limited, Montreal, is suing this firm for $9,000, claiming, it is said, that he received permanent injuries while operating a machine used in making gun shells. In his allegation the plaintiff claims that an apparatus, which was designed to stop the machine, failed to work. He maintains that he was instructed by his foreman to apply an iron tube or pipe as a lever when he desired to halt the machine. Though what he claims to be negligence, as stated, he makes the above statement of claim. It is understood that the defendant company disclaims any liability or negligence.

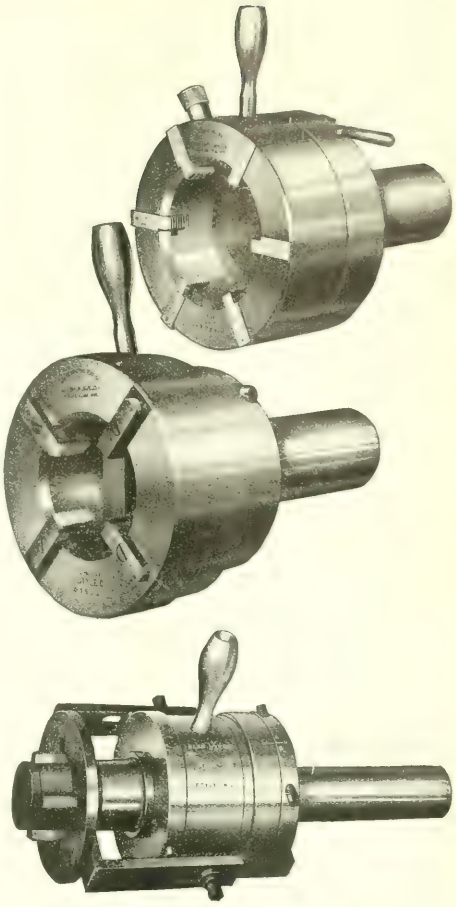
Prescott.—The town of Prescott is looking forward to the deepening of the Welland canal and is trying to secure Government docks. The water front is at present in private hands. The matter has been brought to the attention of Hon. Dr. Reid, Minister of Railways and Canals, who represents the town.

Three Rivers.—The steamer C-9, the ninth vessel built at the National Shipyards, Three Rivers, was launched successfully. The christening ceremony was performed by Madame J. A. Tesser, wife of the Provincial Minister of Highways. The company have an-

A GOOD BOON

"Geometric Tools are a good boon in our business. Always reliable and sure of turning out a class job; in fact, I don't know how we could secure a decent output without them."

This is what the Works Inspector of a London (England) shop says. He adds that they are making screw and small parts for aircraft, and have quite a lot of Geometric Dies in constant use.



Because of the fact that Geometric threading tools are "a good boon" in the thread cutting business, the majority of screw machines and turret lathes are equipped with Geometrics.

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Canadian Agents:

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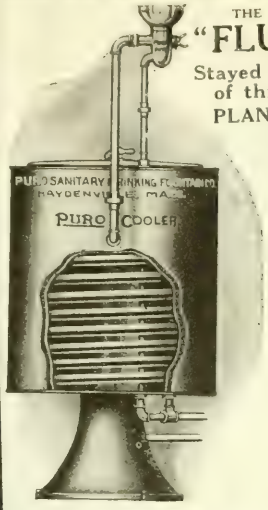

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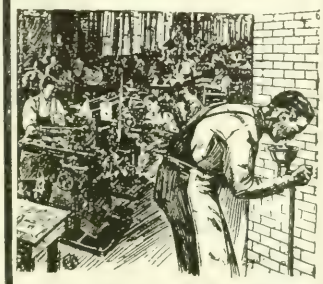

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WM. MUIR & CO., LIMITED
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Agents: Messrs. Peacock Bros., 68 Beaver Hall Hill, Montreal.
Send for catalogue.

BERTRAMS LIMITED
SCIENNES EDINBURGH
Machine Tools
FOR SHIPYARDS ETC

other vessel to launch on the present contract, and have a further contract for four large steel vessels for a French firm.

Bought Furnace.—After an extensive investigation of the various types of electric furnaces and a visit to the U.S. Navy Yard at Puget Sound, where a 6-ton "Greaves-Etchells" furnace is in operation, the Vancouver Engineering Works, Ltd., Vancouver, B.C., has given an order to the Electric Furnace Construction Company for a "Greaves-Etchells" furnace.

Port Salon Ireland.—Salvaging the cargo of the "Laurentic," or that part of it which was formed of specie, is proceeding successfully. The strong room was blown open and a passage made for the divers. After a few buckets full of copper and silver coins had been sent up the work of salving the gold was started. The gold is sent up three bars at a time, each bar being worth about $5,000 and weighs 28 pounds. The whole cargo of bullion is valued at $35,000,000.

Toronto.—The crew of the barge "Chickamango," consisting of six men and a woman, were saved from drowning in Lake Huron by the gallant action of two men. The large was being towed by the steamer "Centurion" when she sprang a leak and sank. A heavy gale was blowing and the "Centurion" was unable to render any assistance to the crew of the barge. She therefore put into Sand Beach and blew distress signals. The tug "James Whalen," Capt. Graham, chief engineer M. Hepburn, put out and in spite of the darkness and heavy sea rescued the six men and the woman. The American life-saving station rescued three more.

Open New Office.—The Carborundum Company announces the opening of branch offices and warehouse in Detroit, Mich. The new Detroit quarters will be located in the Burkhardt Building at Second and Larned Streets. The Detroit branch is under the management of Mr. Anthony Dobson, who will have charge of the Detroit sales district. The new offices and the warehouse are opened with a view to giving quicker and better service to the users of Carborundum products in the Detroit district.

Machinery Wanted in France.—Hon. Philippe Roy, Commissioner General for Canada in Paris, France, reports that Captain Bisson, of the "Office de Reconstitution Industrielle des Departments Victimes de l'Invasion," 14 Rue de la Tremoilie, Paris, would like to get into communication with Canadian manufacturers who can make prompt delivery of the following articles and the prices at which they could supply: Vertical lathes, milling machines, shaping machines, automatic lathes, machines for rolling mills, mortising (slotting) machines, planing machines, boring machines, grinders.

Brantford Planning. — Following out the plan that has been adapted with advantage by some of the larger American cities, Brantford is considering the formation of a City Planning Commission,

which would consider and pass upon all municipal improvements of any kind, such questions as zoning, streets, buildings, parks—everything having to do with growth and development along systematic lines. What is more, Brantford has in view a population of 50,000 or more, and after all is said and done the people realize that it is desirable to have a city that will compare favorably with any.

Robbins and Myers' Plant.—The Robbins & Myers Co., Springfield, O., manufacturers of generators, electric fans and motors, are locating a Canadian factory in Brantford. It is announced that they will erect a factory on what is known as the Waterworks property, occupying ten acres. The concern will begin operations with about 300 employees. The industrial commission of Brantford is negotiating with several other firms planning to open branches in Canada.

Scrap Prices High.—Reports from the Welland and St. Catharines districts place values of from $13 to $16 a ton on available high-grade munition scraps, with every indication of still higher prices.

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MACHINE WORK WANTED FOR LATHES, shapers, milling machine and planer, etc. Hourly or contract basis. Prompt delivery. W. H. Sumbling Machinery Co., Toronto. (ctfm)

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A firm of Canadian engineers to manufacture and sell on royalty basis a hand-operated stoker. This is an established success and is the ideal installation for the small plant where investment cost is an important item. Combustion principles are upon an highest priced automatic stokers. The only stoker for the Canadian market, where the one boiler plant is in the majority. Write to Box 622, Canadian Machinery, 143 University Ave., Toronto, Canada.

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Two Canadian Patented Steam Specialties for sale; one Steam Trap, Patent Number 187215, and one Steam Separator, Patent Number 183340.

Allentown Experimental Works
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MOTOR AGENCIES. A FIRM OF MOTOR engineers in London, England, is open to take the sole English agency for a good Canadian make of motor car. Representative of the firm is shortly coming to Canada. Apply Box 626, Canadian Machinery. (c12m)

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BRANTFORD PATTERN WORKS ARE PREpared to make up patterns of any kind—including marine works—to sketches, blue prints or sample castings. Prompt, efficient service. Bell 'Phone 631; Machine 'Phone 733. Brantford Pattern Works, 49 George St., Brantford, Ont. (etfm)

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Free Turning

Round Brass Rod

Mill lengths of the following sizes:—	Diameter
30,000 lbs... .250"	¼"
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46,750 lbs... 1.000"	1"
45,000 lbs... 1.250"	1¼"
26,000 lbs... 1.375"	1⅜"
39,000 lbs... 2.000"	2"

Above is all new material stored at the manufacturers' plant in Connecticut, ready for prompt shipment and has passed Government inspection. Address Box 625 Canadian Machinery.

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Alley & McLellan Air Compressor 600 ft. at 100 lbs. pressure, 125 H.P. Motor, heavy duty 600 R.P.M. 3 phase 60 cycle 550 volts.
Ingersoll-Rand 800 ft. Air Compressor.
1 Tube Mill Fraser & Chalmers 5 x 22.
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Also large assortment of Pumps, Tanks, Classifiers, Boilers and Mining Equipment for sale.

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One Oliver Tool Room Lathe, 16 in. by 7 ft. bed, complete with taper attachment, relieving attachment, chuck, etc., hollow spindle, double back gear, large and small face plate and steady rest, in perfect condition.

One LeBlond Tool Room Lathe, plain change gears, single back gear, hollow spindle, 16 in. by 6 ft. bed.

Two C.M.C. Lathes, 20 in. by 8 ft. bed, double back gear, hollow spindle, semi quick change gear.

Two Davenport, 22 in. by 10 ft., quick change gear lathes, like new, very cheap.

Also full line of other Machine Tools and Woodworking Machinery. For full particulars apply to the Standard Equipment & Tool Works, 179 St. James St., Montreal, Que. (c15m)

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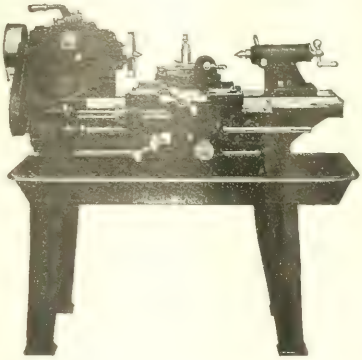
Ingersoll, Ont., offers a factory of twenty thousand square feet of floor space on terms which cannot be equalled in Canada. **Are you interested?**

Write S. A. GIBSON, Industrial Commissioner, or MAYOR J. V. BUCHANAN, Ingersoll. c14m

Wanted representing agents and merchants to sell and represent firm manufacturing Milling Cutters, Twist Drills, Reamers, Lathe Tools, Planer Tools, High Speed Steel and Alloy Tools, and Merchants' Tools. Good terms and discounts for selling or representing offered. Apply Lawton Bros., Woodseats Engineering Works, Sheffield, England. c13m

ADAMS SHORT CUT LATHE



Floor space 54 x 28. Swing 13⅝. Between centres 20". Will do 50 per cent. more work than regular engine lathe of same capacity, and will do it better.

For those making short, duplicate parts, twist drills, machine, automobile parts, etc., this lathe is unexcelled.

Last week Ford Motor Car Co., and Hudson Motor Car Co. of Detroit bought seven. Westinghouse Electric and Brown-Lipe-Chaplin Co. added several to their present installations.

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This equipment was placed on the United States market early in 1918, is fully protected by United States patents, and Canadian patents have been applied for within the required time.

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Toronto, Canada

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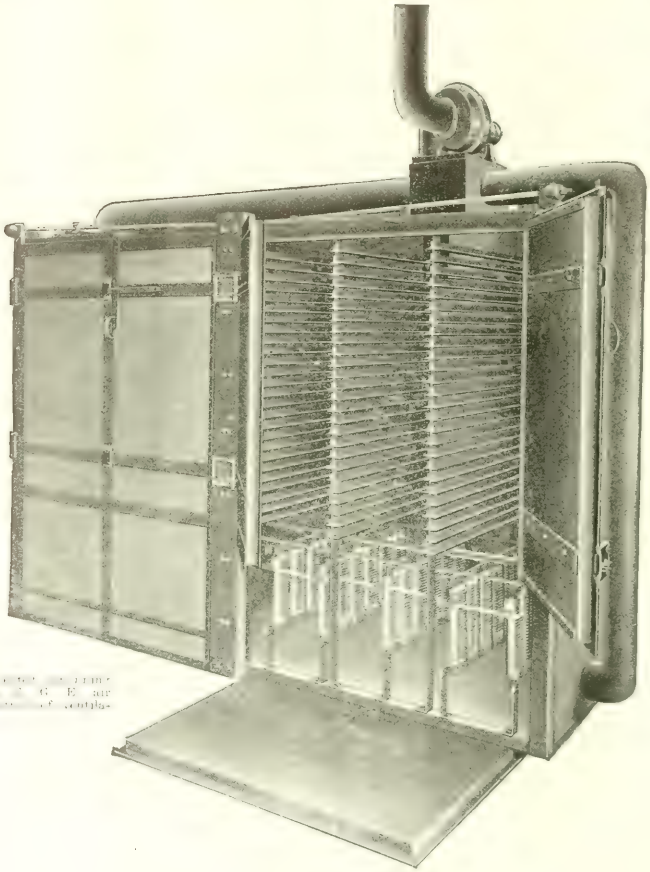
Electric Ovens



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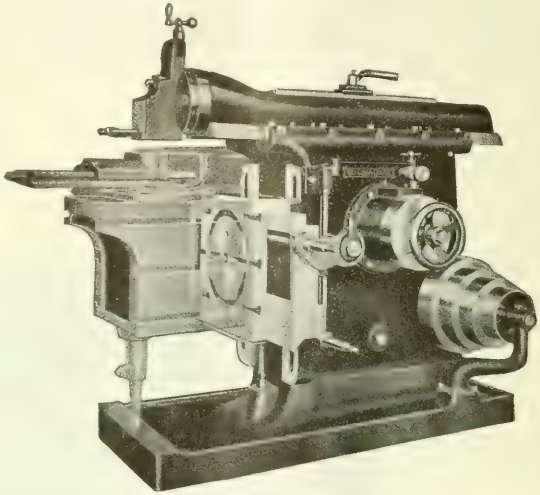
Milwaukee simplicity, power and accuracy play an important part in turning overhead expense into profitable production.



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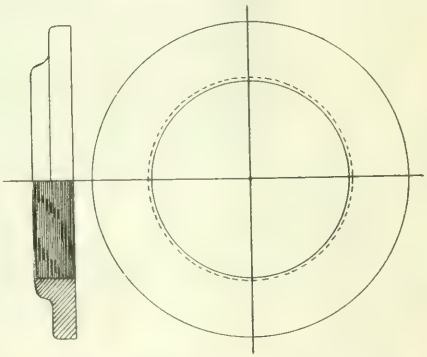
Milling and facing a standard cast iron flange in 4 min. and 45 sec. is a performance that must appeal to every machinist. This is what the Smalley-General Thread Miller accomplished, on the piece illustrated herewith. This is saving time and cutting costs with a vengeance.

Have you a manufacturing proposition that needs stimulating? Then the Smalley-General Thread Miller is the machine you need.

Send us blue prints, or actual piece of work. Our engineers will then show you how our Miller will turn out the work for you.



Typical Operation and Time Study

Machine—Smalley General Flange Thread Miller No. 1. Air operated collet Chuck.
Piece Milled and Faced—Standard cast iron 125 lb. pressure 8" flange. Facing 13½" O.D. x 8¾" I.D.
Thread 8¾" diameter, 1¾" long, 8 pitch Briggs tapered.

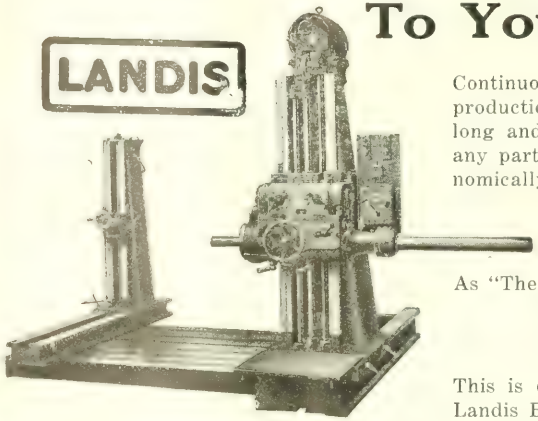
Time study	Min.	Sec.
Chucking from floor	..	15
Facing ⅜" feed	1	40
Adjusting hob	..	10
Milling	2	30
Removing from chuck	..	10

Time complete operation, floor to floor.. 4 min. 45 seconds Milling Feed 10½" per minute. Limits .003. Entire flange finished in one chucking. Face and threads in perfect alignment.

SMALLEY-GENERAL CO., Inc., BAY CITY, MICH.

Canadian Agents: Rudel-Belnap Co., Ltd., Montreal and Toronto

Does Continuous Operation Mean Anything To You?



Continuous operation means more than super production; it means the ability to withstand long and continued abuse without failure in any part and yet produce accurately and economically.

As "The Cincinnati Planer Co." states:

"It is operating night and day, on very heavy work, without a moment's trouble, and is giving first class satisfaction."

This is only part; send for catalog covering Landis Boring, Milling and Drilling Machines.

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60 Rivets in a Minute

Faster if the work can be fed faster.
But at least 60 every minute.
And in tightest corners just as fast. Every head just as smooth. Not a bent shank; not a tool mark on either rivet head or casting.

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The Detroit Gear Grinding Machine Company use NATCO Multi-Drillers in completing the drilling of 46 Clutch per hour. Each hub has four ⅝-in. and four 25 64-in. holes which are drilled ¾-in. deep in one operation. In the next operation four of the holes are countersunk.

Change of Speed for each Spindle permits each tool to remove its proportional amount of metal. Idle spindles are in neutral, saving wear and power. Results are greater production with less wear and breakage of drills.

If you have more than one hole to drill in a given piece there's a NATCO for the job. **NATCOS are built in 11 sizes, ranging from 2 to 72 spindles.**

We also design and build jigs and fixtures for use in connection with NATCO Multi-Drillers.

National Automatic Tool Company

Richmond, Ind., U.S.A.

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Burton, Griffiths & Co., British Isles.
E. Isbecque & Co., Belgium.
Aux Forges De Vulcain, France.
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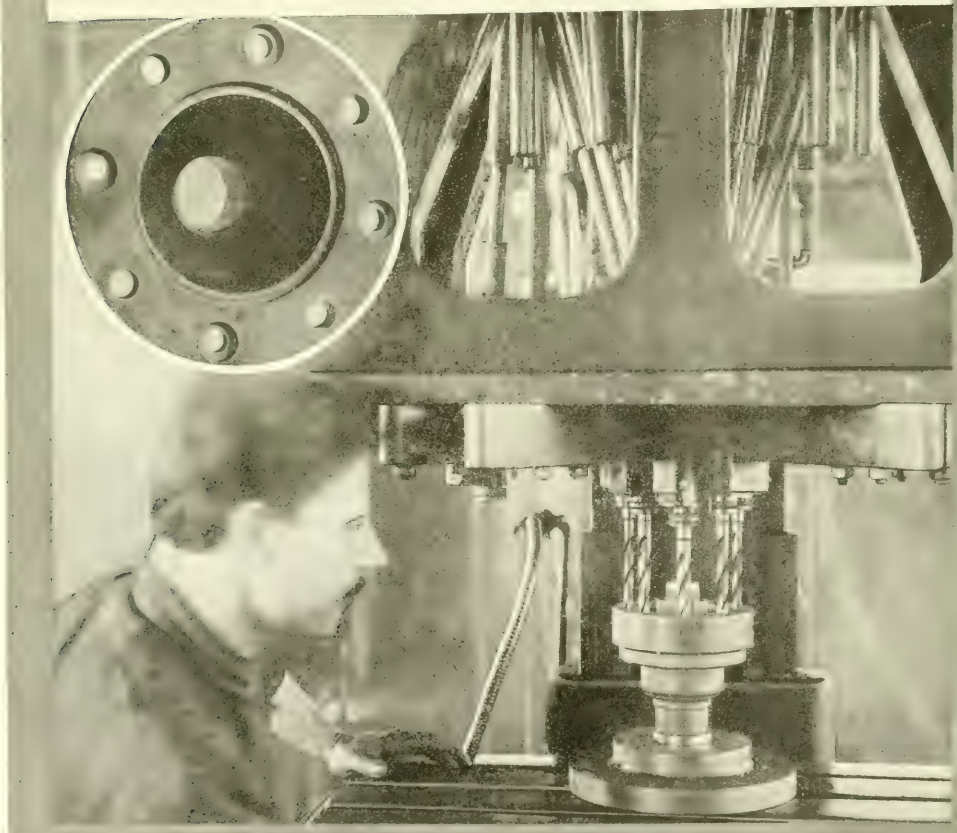

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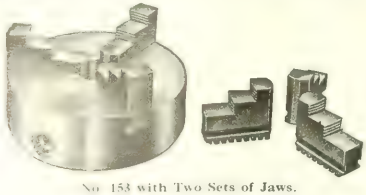

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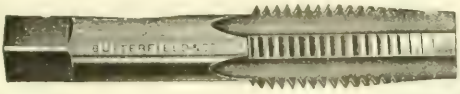

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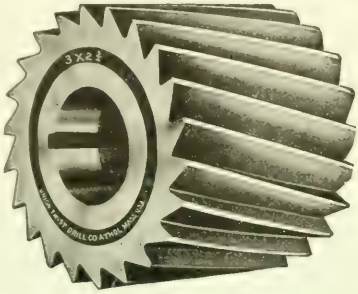

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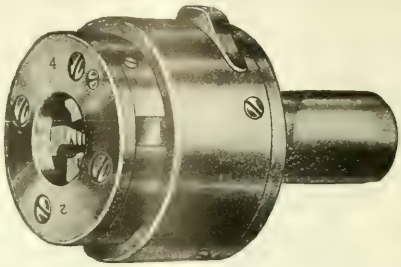

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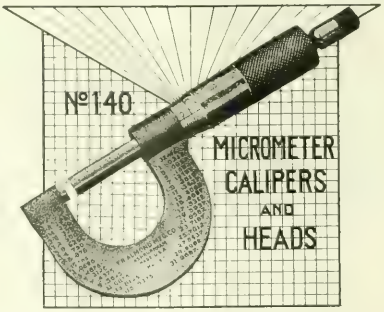

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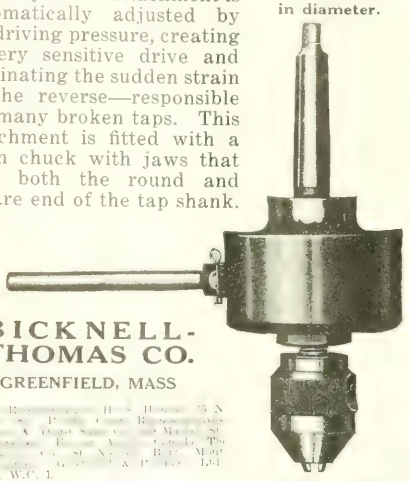

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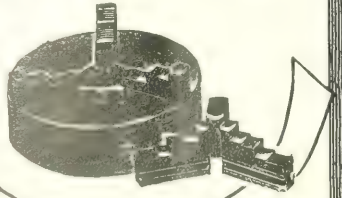

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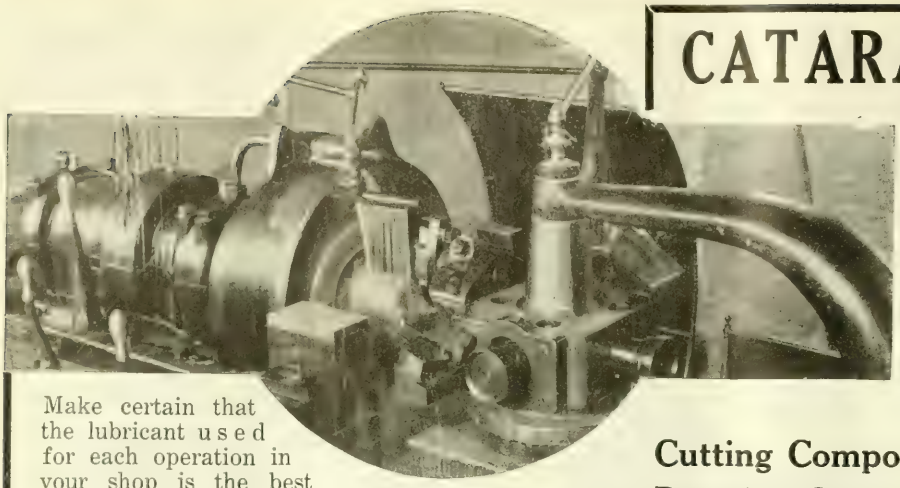

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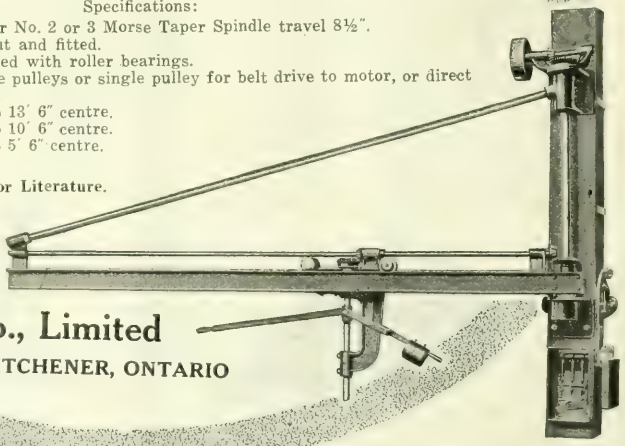

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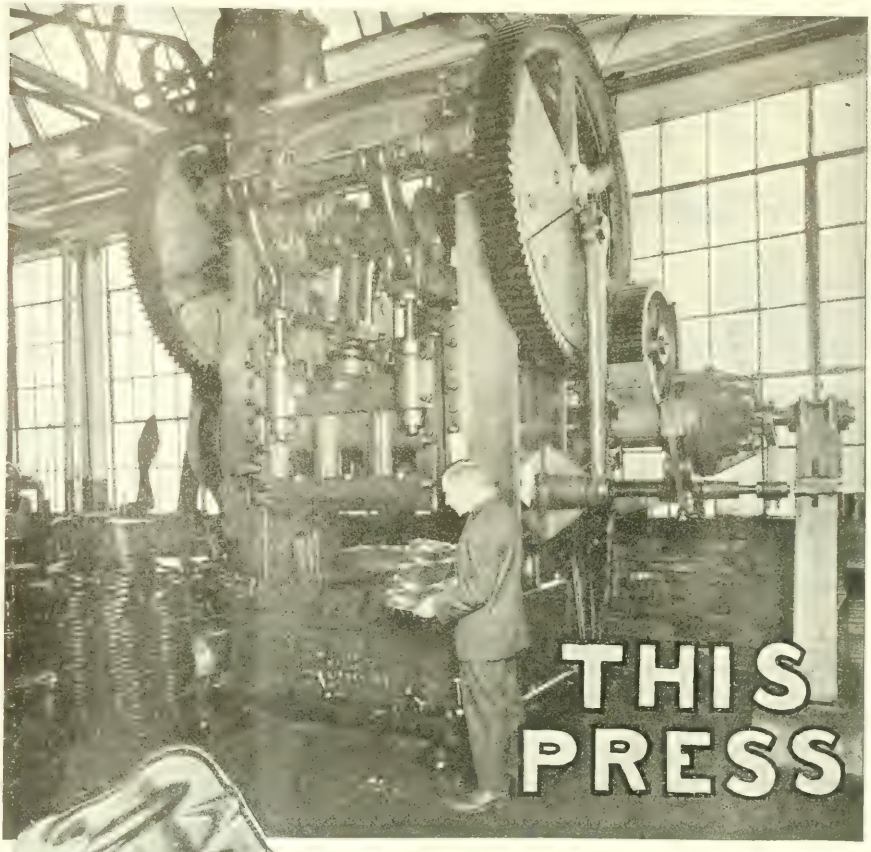

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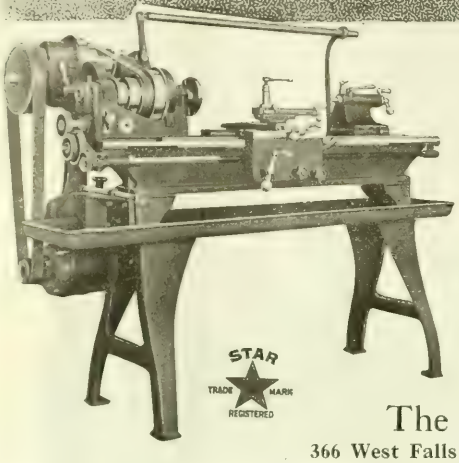

Because of the belts it has a flexibility not found in ordinary geared-head lathes. Provision is made for quickly tightening belts and they may be kept at proper tension until worn out, without shortening. Movement of spindle is controlled by shifting bar.

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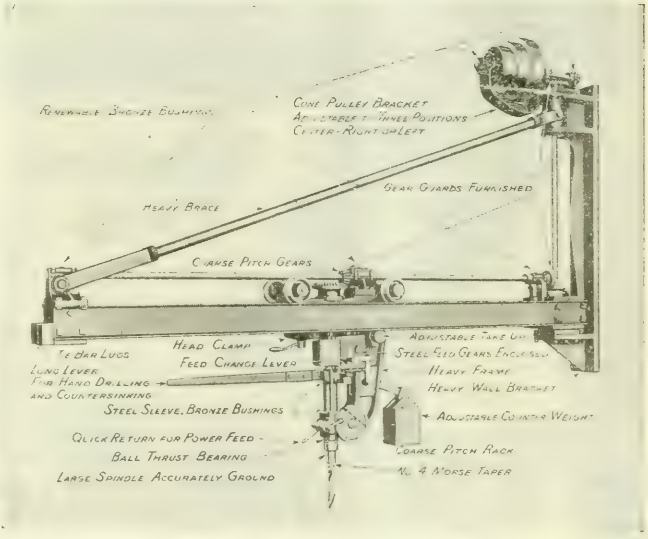

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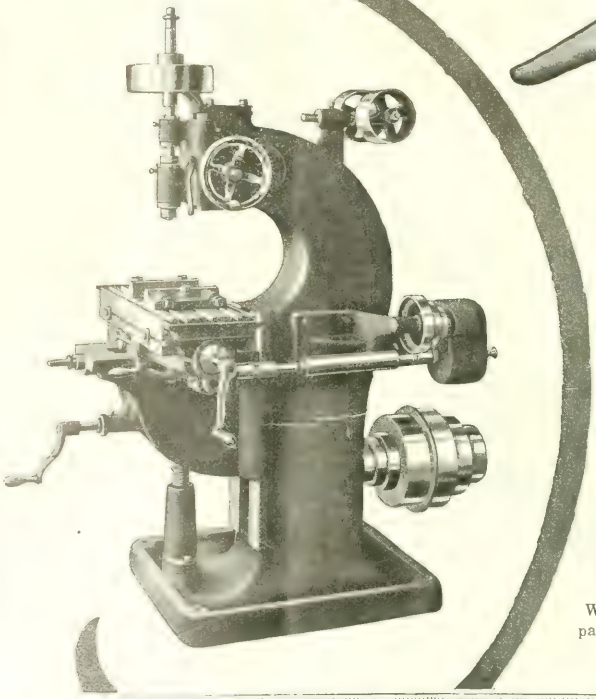

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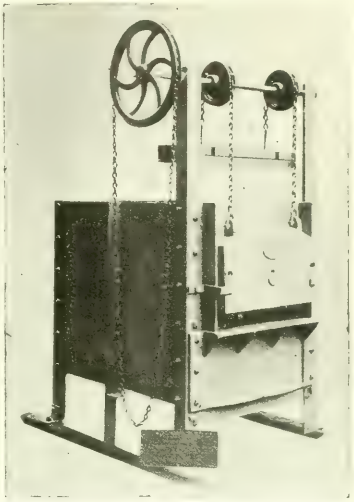

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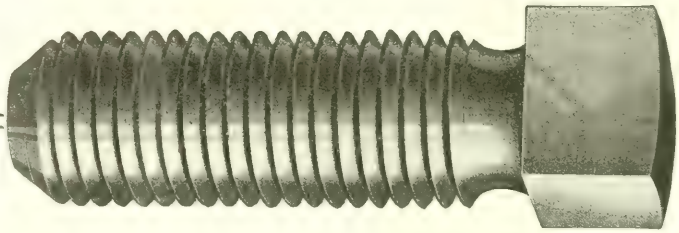

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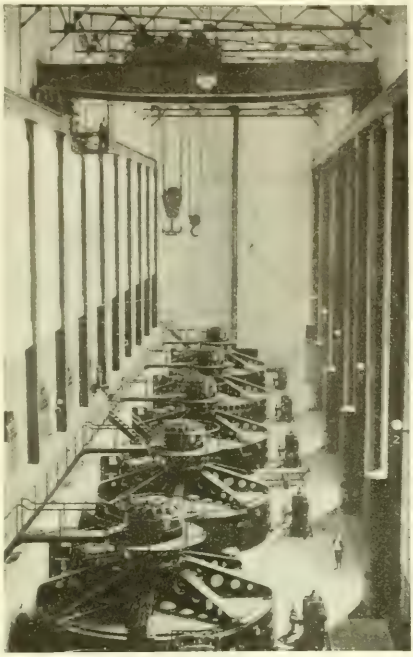

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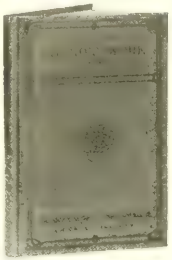

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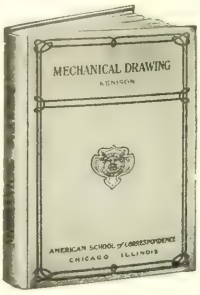

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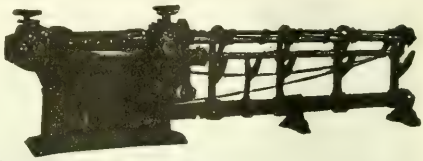

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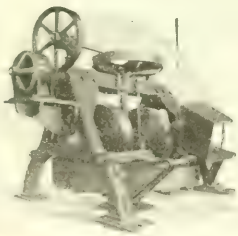

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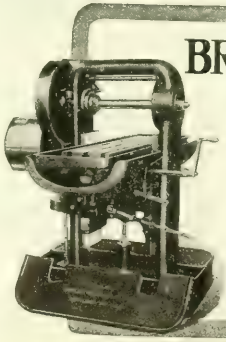

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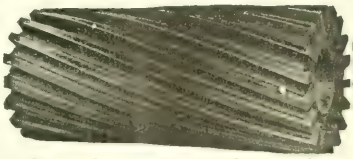

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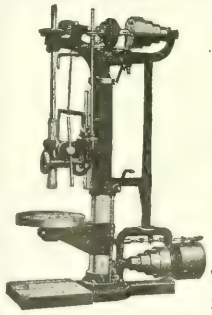

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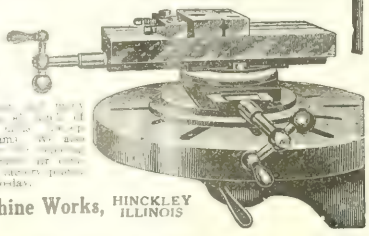

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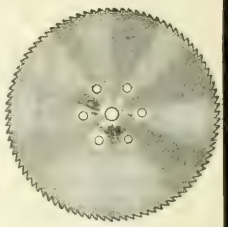

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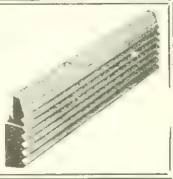

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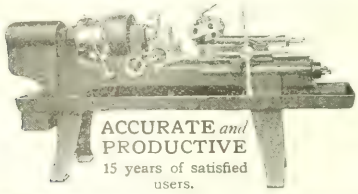

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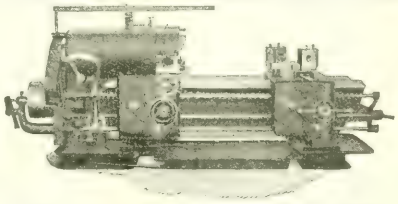

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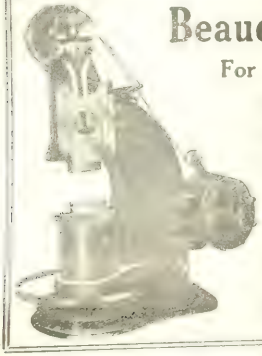

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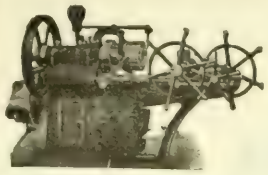

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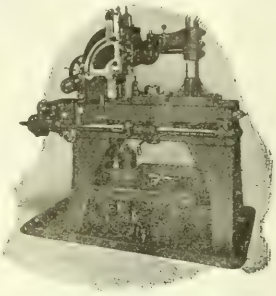

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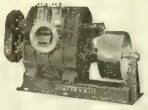

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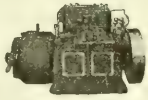

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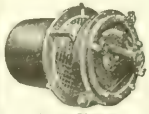

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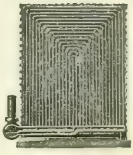

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BOLT THREADING MACHINERY

Jardine & Co. Ltd., B., Hespeler
Landis Machine Co., Waynesboro, Pa.
National Acme Co., Cleveland, Ohio.
Victor Tool Co., Waynesboro, Pa.
Williams & Wilson Limited, Montreal

BORING MACHINES, PNEUMATIC CYLINDER

Cleveland Pneumatic Tool Co., Toronto.
Canadian Fairbanks-Morse Co., Montreal
Can. Ingersoll-Rand Co., Sherbrooke, Que.
Garlock-Walker Mach. Co., Toronto.

BORING MACHINES, UPRIGHT AND HORIZONTAL

Bertram & Sons Co., John, Dundas, Ont.
Betts Machine Co., Rochester, N.Y.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto
Ottawa Machy. Agency, Grand Rapids, Mich.
Gisholt Machine Co., Madison, Wis.
Fosse Mfg. Co., Geo. F., Montreal
Lucas Tool Co., Waynesboro, Pa.
Niles-Bement-Pond Co., New York
Rockford Machine & Tool Co., Toronto
Williams & Wilson, Ltd., Montreal, Que.

BORING AND TURNING MILLS

Bertram & Sons Co., John, Dundas, Ont.
Betts Machine Co., Rochester, N.Y.
Canada Machinery Corp., Galt, Ont.
Gisholt Machine Co., Madison, Wis.
Fosse Mch. & Sply Co., Geo. F., Montreal
Oliver Mach Co., Grand Rapids, Mich.

BOILERS

Dominion Bridge Co., Montreal, Que.
MacGovern & Co., Montreal, Que.

BOILER BREECHINGS

William Hamilton Co., Peterboro, Ont.

BOLT CUTTERS AND NUT TAPERS

Aikenhead Hardware Co., Toronto, Ont.
Canadian Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto.
Landis Machine Co., Waynesboro, Pa.
A.B. Jardine & Co., Ltd., Hespeler, Ont.
Rice Lewis & Son, Toronto, Ont.
Wells Bros. Co. of Canada, Galt, Ont.
Williams & Wilson, Limited, Montreal.

BOLTS

Aikenhead Hardware Co., Toronto, Ont.
London Bolt & Hinge Wks., London, Ont.
Morrow Screw & Nut Co., John, Ingersoll.
Rice Lewis & Son, Toronto, Ont.
Steel Co. of Canada, Ltd., Hamilton.
Wilkenson & Heap, Limited, Guelph, Ont.
Williams & Wilson, Ltd., Montreal.
Wm. Jessop & Sons, Ltd., Sheffield, Eng.

BOLTS, CUTTING

Galt Machine Screw Co., Ltd., Galt, Ont.

BOLTS, STAY

Morrow Screw & Nut Co., John Ingersoll.

BOLTS, SPRING SHAKLE

Can. Winkler Co., Ltd., Windsor, Ont.
Morrow Screw & Nut Co., John, Ingersoll.

BOLTS, PATCH

Morrow Screw & Nut Co., John, Ingersoll.

BOLT AND NUT MACHINERY

Bertram & Sons Co., John, Dundas, Ont
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto.
Gardner & Son, Robt., Montreal
Landis Machine Co., Waynesboro, Pa.
National Acme Co., Cleveland, Ohio.
National Machinery Co., Tiffin, Ohio.
Williams & Wilson, Ltd., Montreal, Que.
Williams Machinery Co., A. R., Toronto

BOLT THREADING MACHINERY

Jardine & Co. Ltd., B., Hespeler
Landis Machine Co., Waynesboro, Pa.
National Acme Co., Cleveland, Ohio.
Victor Tool Co., Waynesboro, Pa.
Williams & Wilson Limited, Montreal

BORING MACHINES, PNEUMATIC CYLINDER

Cleveland Pneumatic Tool Co., Toronto.
Canadian Fairbanks-Morse Co., Montreal
Can. Ingersoll-Rand Co., Sherbrooke, Que.
Garlock-Walker Mach. Co., Toronto.

BORING MACHINES, UPRIGHT AND HORIZONTAL

Bertram & Sons Co., John, Dundas, Ont.
Betts Machine Co., Rochester, N.Y.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto
Ottawa Machy. Agency, Grand Rapids, Mich.
Gisholt Machine Co., Madison, Wis.
Fosse Mfg. Co., Geo. F., Montreal
Lucas Tool Co., Waynesboro, Pa.
Niles-Bement-Pond Co., New York
Rockford Machine & Tool Co., Toronto
Williams & Wilson, Ltd., Montreal, Que.

BORING AND TURNING MILLS

Bertram & Sons Co., John, Dundas, Ont.
Betts Machine Co., Rochester, N.Y.
Canada Machinery Corp., Galt, Ont.
Gisholt Machine Co., Madison, Wis.
Fosse Mch. & Sply Co., Geo. F., Montreal
Oliver Mach Co., Grand Rapids, Mich.

ACETYLENE

Cleve Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
Union Carbide Co., Toronto, Ont.
Welsbach Co., Montreal, Que.

ACETYLENE GENERATORS

Prest-O-Lite Co., Inc., Toronto, Ont.
Welding & Supplies Co., Montreal, Que.

ACORN DIE AND HOLDERS

Greenfield Tap & Die Corp., Greenfield Mass.
Wells Bros. of Canada, Galt, Ont.

ACCUMULATORS, HYDRAULIC

Canadian Fairbanks-Morse Co., Montreal
Garlock-Walker Machy. Co., Toronto.
Metalwood Mfg. Co., Detroit, Mich.
Niles-Bement-Pond Co., New York
Williams & Wilson, Ltd., Montreal.

AIR COMPRESSORS

See Compressors

AIR CYLINDERS

Smart-Turner Mach. Co., Hamilton, Ont.

AIR RECEIVERS

Can. Ingersoll-Rand Co., Sherbrooke, P.Q.
Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Smart-Turner Machine Co., Montreal
Williams & Wilson, Ltd., Montreal
Wickes Bros., Saginaw, Mich.

AIR WASHERS

Can. Blower & Forge Co., Kitchener, Ont.

ALUMINUM

Canada Metal Co., Toronto.
Lyman Tube & Metal Co., Hamilton, Ont.
Wickes Bros., Saginaw, Mich.

ALLOY, STEEL

Atlas Steel Co., Montreal
Electric Steel & Metals Co., Welland, Ont.
Ingersoll Rock Drill Co., Montreal, Que.
Rennie, A. C., Limited, Montreal
Standard Machy. Co., Montreal, Que.
Steel Co. of Canada, Hamilton, Ont.
Taylor-Stiles Co., Riverdale, Ont.
Thos. Williams & Son, Montreal.
Vulcan Steel Co., Montreal, Que.
Welland Steel & Importing, Montreal.
Wickes Bros., Saginaw, Mich.
Wm. Jessop & Sons, Ltd., Sheffield, Eng.

ANCHORS

Fellows Bros., Ltd., Chadlew Heath, Eng.

ARBORS

Brown & Sharpe Mfg. Co., Providence, R.I.
Cleveland Twist Drill Co., Montreal
Fellows Bros., Ltd., Montreal
Geometric Tool Co., New Haven, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Waynesboro, Pa.
Pratt & Whitney Co., Hartford, Conn.
Rice Lewis & Son, Toronto, Ont.
Standard Machy. Co., Montreal, Que.
Taylor-Stiles Co., Riverdale, Ont.
Williams & Wilson, Ltd., Montreal.

ARMOR PLATE

Algoma Steel Corp., Sault Ste. Marie, Ont.
Canada Iron Corp., Montreal, Que.
Dominion Bridge Co., Montreal, Que.
Electric Steel & Metals Co., Welland, Ont.
Hamilton Bridge Works Co., Hamilton, Ont.
Ingersoll Rock Drill Co., Montreal, Que.
Lake Superior Corporation, Sault Ste. Marie, Ont.
Montreal Locomotive Works, Montreal, Que.
Pittsburgh Crushed Steel Co., Pittsburgh, Pa.
Standard Machy. Co., Montreal, Que.
Steel Co. of Canada, Hamilton, Ont.
Vulcan Steel Co., Montreal, Que.
Welland Steel & Importing, Montreal.
Wm. Jessop & Sons, Ltd., Sheffield, Eng.

ARRESTERS, DUST

Canada Foundry Co., Toronto, Ont.
Canadian Ingersoll-Rand Co., Sherbrooke, Que.
Garlock-Walker Mach. Co., Toronto.

ASBESTOS MATERIAL

Johns-Manville Co., Montreal, Que.

ASBESTOS PACKING

Garlock-Walker Machy. Co., Toronto.
Johns-Manville Co., Montreal, Que.

ASBESTOS PIPE COVERING

Johns-Manville Co., Montreal, Que.

ASBESTOS ROOFING

Johns-Manville Co., Montreal, Que.

ASBESTOS SHEATHING

Johns-Manville Co., Montreal, Que.

ASBESTOS WOOD

Johns-Manville Co., Montreal, Que.

AUGERS

Cleveland Twist Drill Co., Montreal
Fellows Bros., Ltd., Montreal
Geometric Tool Co., New Haven, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Waynesboro, Pa.
Pratt & Whitney Co., Hartford, Conn.
Rice Lewis & Son, Toronto, Ont.
Standard Machy. Co., Montreal, Que.
Taylor-Stiles Co., Riverdale, Ont.
Williams & Wilson, Ltd., Montreal.

AUTO SHEET METAL MACHINERY

Quickwork Co., St. Marys, Ohio.

AUXILIARY HEADS

Hoefer Mfg. Co., Freeport, Ill.

BABBITT METAL

Canada Metal Co., Ltd., Toronto, Ont.
Hoyt Metal Co., Ltd., Toronto.
Magnolia Metal Co., Montreal.
Rice Lewis & Son, Toronto, Ont.
Tallman Brass & Metal Co., Hamilton.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Limited, Montreal.

BAND SAWS

Oliver Machy. Co., Grand Rapids, Mich.

BALL BEARINGS

Canadian Fairbanks-Morse Co., Montreal
Can. S K F Co., Toronto, Ont.
Chapman Double Ball Bearing Company, Toronto
The Gray Ball Bearing Co., Ltd., Toronto
Morrow Screw & Nut Co., John, Ingersoll
Rochester Ball Bearing Co., Rochester.
Williams & Wilson, Ltd., Montreal, Que

BALLS, STEEL

Atkins & Co., Ltd., Wm., Sheffield, Eng.
Blakeslee Co., L. C., New York City
Chapman Double Ball Bearing Co., Toronto
Boker & Co., Inc., Montreal, Que.
Gray Ball Bearing Co., Ltd., Toronto.
Rochester Ball Bearing Co., Rochester.
Marshall, Son & Bunney, Toronto.
Williams & Wilson, Limited, Montreal

BALLS, BURNISHING

Gray Ball Bearing Co. Ltd., Toronto

BAROMETERS

Taylor Instrument Co., Rochester, N.Y.

BARRELS, SAND-BLAST

Pangborn Corp., Hagerstown, Md.

BARRELS, STEEL SHOP

Baird Machine Co., Bridgeport, Conn.
Cleveland Wire Spring Co., Cleveland.

BARRELS, TUMBLING

Baird Machine Co., Bridgeport, Conn.
Katie Foundry, Galt, Ont.
Northern Crown Works, Walkerville, Ont.
Wilson & Co., J. C., Belleville, Ont.
Williams & Wilson, Ltd., Montreal, Que

BASE FACING MACHINES

Victoria Foundry Co., Ottawa, Ont.

BARS, BORING

Gisholt Machine Co., Madison, Wis.
Niles-Bement-Pond Co., New York.
Wilson & Co., J. C., Belleville, Ont.
Williams & Co., J. H., Brooklyn, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

BARS, MERCHANT

Algoma Steel Corp., Sault Ste. Marie.

BARS, CONCRETE REINFORCING

Algoma Steel Corp., Sault Ste. Marie

BEADING MACHINES

Quickwork Co., St. Marys, Ohio.

BELT CONVEYORS

Can. Link-Belt Co., Toronto, Ont.
Williams & Wilson, Limited, Montreal

BEARINGS, BRONZE

Wilson & Co., J. C., Belleville, Ont.

BEARINGS, DIE CAST

Franklin Mfg. Co., Syracuse, N.Y.

BELT-LACING MACHINES, HOOKS AND PINS

Clipper Belt Lacer Co., Grand Rapids

BELT LACING LEATHER

Aikenhead Hardware Co., Toronto, Ont.
G. F. Foss Mchy. & Sply. Co., Montreal
Graton & Knight Mfg., Worcester, Mass.
Rice Lewis & Son, Toronto, Ont.

BELT HOOKS, WIRE

Clipper Belt Lacer Co., Grand Rapids

BELTING, BALATA

Federal Engineering Co., Toronto, Ont.
Wells Bros., of Can., Galt, Ont.
Aikenhead Hardware Co., Toronto, Ont.
Canadian Fairbanks-Morse Co., Montreal
Canada Metal Co., Toronto.
G. F. Foss Mchy. & Sply. Co., Montreal.

AUTO SHEET METAL MACHINERY

Quickwork Co., St. Marys, Ohio.

AUXILIARY HEADS

Hoefer Mfg. Co., Freeport, Ill.

BABBITT METAL

Canada Metal Co., Ltd., Toronto, Ont.
Hoyt Metal Co., Ltd., Toronto.
Magnolia Metal Co., Montreal.
Rice Lewis & Son, Toronto, Ont.
Tallman Brass & Metal Co., Hamilton.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Limited, Montreal.

BAND SAWS

Oliver Machy. Co., Grand Rapids, Mich.

BALL BEARINGS

Canadian Fairbanks-Morse Co., Montreal
Can. S K F Co., Toronto, Ont.
Chapman Double Ball Bearing Company, Toronto
The Gray Ball Bearing Co., Ltd., Toronto
Morrow Screw & Nut Co., John, Ingersoll
Rochester Ball Bearing Co., Rochester.
Williams & Wilson, Ltd., Montreal, Que

BALLS, STEEL

Atkins & Co., Ltd., Wm., Sheffield, Eng.
Blakeslee Co., L. C., New York City
Chapman Double Ball Bearing Co., Toronto
Boker & Co., Inc., Montreal, Que.
Gray Ball Bearing Co., Ltd., Toronto.
Rochester Ball Bearing Co., Rochester.
Marshall, Son & Bunney, Toronto.
Williams & Wilson, Limited, Montreal

BALLS, BURNISHING

Gray Ball Bearing Co. Ltd., Toronto

BAROMETERS

Taylor Instrument Co., Rochester, N.Y.

BARRELS, SAND-BLAST

Pangborn Corp., Hagerstown, Md.

BARRELS, STEEL SHOP

Baird Machine Co., Bridgeport, Conn.
Cleveland Wire Spring Co., Cleveland.

BARRELS, TUMBLING

Baird Machine Co., Bridgeport, Conn.
Katie Foundry, Galt, Ont.
Northern Crown Works, Walkerville, Ont.
Wilson & Co., J. C., Belleville, Ont.
Williams & Wilson, Ltd., Montreal, Que

BASE FACING MACHINES

Victoria Foundry Co., Ottawa, Ont.

BARS, BORING

Gisholt Machine Co., Madison, Wis.
Niles-Bement-Pond Co., New York.
Wilson & Co., J. C., Belleville, Ont.
Williams & Co., J. H., Brooklyn, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

BARS, MERCHANT

Algoma Steel Corp., Sault Ste. Marie.

BARS, CONCRETE REINFORCING

Algoma Steel Corp., Sault Ste. Marie

BEADING MACHINES

Quickwork Co., St. Marys, Ohio.

BELT CONVEYORS

Can. Link-Belt Co., Toronto, Ont.
Williams & Wilson, Limited, Montreal

BEARINGS, BRONZE

Wilson & Co., J. C., Belleville, Ont.

BEARINGS, DIE CAST

Franklin Mfg. Co., Syracuse, N.Y.

BELT-LACING MACHINES, HOOKS AND PINS

Clipper Belt Lacer Co., Grand Rapids

BELT LACING LEATHER

Aikenhead Hardware Co., Toronto, Ont.
G. F. Foss Mchy. & Sply. Co., Montreal
Graton & Knight Mfg., Worcester, Mass.
Rice Lewis & Son, Toronto, Ont.

BELT HOOKS, WIRE

Clipper Belt Lacer Co., Grand Rapids

BELTING, BALATA

Federal Engineering Co., Toronto, Ont.

BELTING, RUBBER

Can. Consolidated Rubber Co., Montreal

BELTING, CHAIN

Can. Fairbanks-Morse Co., Montreal.
Can. Link-Belt Co., Toronto, Ont.
Jones & Glassco, Montreal, Que.
Morse Chain Co., Ithaca, N.Y.
Whitney Mfg. Co., Hartford, Conn.
Williams & Wilson, Ltd., Montreal, Que.

BELTING, CONVEYOR

Can. Consolidated Rubber Co., Montreal.
Baxter & Co., Ltd., J. R., Montreal.
Canadian Fairbanks-Morse Co., Montreal
Federal Engineering Co., Ltd., Toronto.
Graton & Knight Mfg., Worcester, Mass
Jones & Glassco, Montreal, Que.
McLaren Belting Co., J. C., Montreal.
Morse Chain Co., Ithaca, N.Y.
Plewes, Ltd., Winnipeg, Man.
Rice Lewis & Son, Toronto, Ont.
Standard Machy. & Supplies, Montreal.
Williams & Wilson, Ltd., Montreal, Que.

BELTING, FRICTION AND SURFACE

Can. Con. Rubber Co., Ltd., Montreal.

BELTING, LEATHER

Can. Graton & Knight Mfg. Co., Montreal
John Tullis & Son, Glasgow, Scotland.

BELTING, WOVEN

Federal Engineering Co., Ltd., Toronto

BENDING ROLLS, PLUTE & AUGH

Wickes Bros., Saginaw, Mich.

BENDING MACHINERY

Bertrams, Ltd., Edinburgh, Scotland.
Bertram & Sons Co., John, Dundas
Brown-Boggs Co., Ltd., Hamilton, Ont.
Can. Blower & Forge Co., Kitchener, Ont.
Garlock-Walker Mach. Co., Toronto.
Williams & Wilson, Ltd., Montreal.

BLASTING MACHINES, SAND

Garlock-Walker Machinery Co., Toronto.
Jardine, A. B., & Co., Hespeler, Ont.
National Mach. Co., Tiffin, Ohio.
Niles-Bement-Pond Co., New York.
Toledo Machine & Tool Co., Toledo
Williams & Wilson, Limited, Montreal.

BILLET MARKERS

Matthews & Co., Jas. H., Pittsburgh, Pa

BILLETS

Atkins & Co., Ltd., Wm., Sheffield, Eng.
Swedish Steel & Importing Co., Ltd., Montreal.
Algoma Steel Corp., Sault Ste. Marie.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent, Montreal

BILLETS, FORGING

General Steel Co., Milwaukee, Wis.
Kayser-Ellison & Co., Ltd., Montreal
Norton, Ralph B., Agent, Montreal.

BINS, STEEL

Dennis Wire & Iron Works, London, Ont
Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Toronto Iron Works, Ltd., Toronto, Ont.
William Hamilton Co., Peterboro, Ont.

BLACKSMITH WORK

The Thos. Pink Co., Ltd., Pembroke

BLANKING

Hy. Hope & Sons of Can., Ltd., Peterboro

BLASTING MACHINES, SHOT AND STEEL GRIT

Pittsburgh Crushed Steel Co., Pittsburgh

BLOOMS AND SLABS

Algoma Steel Corp., Sault Ste. Marie

BLOWERS

Can. Blower & Forge Co., Kitchener, Ont.
Garlock-Walker Machinery Co., Toronto.
MacGovern & Co., Montreal, Que.
Williams & Wilson, Limited, Montreal.

BLOCK, CHAIN AND ROPE

Fellows Bros., Ltd., Chadlew Heath, Eng.

BLOCKS, CARGO

Fellows Bros., Ltd., Chadlew Heath, Eng.

BLOW PIPES AND REGULATORS

Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
Welding & Supplies Co., Montreal, Que.

BLUE PRINTING MACHINERY

Commercial Camera Co., Providence, R.I.
Wickes Bros., Saginaw, Mich.

BOARDS, GLASS CUTTING

Lufkin Rule Co., of Can., Windsor, Ont.

BOARTZ

Jones, Kochel & Co., Inc., New York.

BOLT CUTTERS

Greenfield Tap & Die Corp., Greenfield, Mass

BOLT CUTTERS

Fellows Gear Shaper Co., Springfield, Vt.
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros., of Can., Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

BOOKS, TECHNICAL

MacLean Publishing Co., Toronto.

Niles-Bement-Pond Co., New York.
Williams & Wilson, Ltd., Montreal, Que.

BOXES CAST IRON
Brown & Sharpe Mfg. Co., Providence, R.I.

BOXES, STEEL SHOP AND TOTE
Cleveland Wire Spring Co., Cleveland.

BRAKEBAND LINING CUTTERS
Peck, Stow & Wilcox Co., Southington, Conn.

BRAKES
Brown, Boggs & Co., Hamilton, Can.
Electric Steel & Metals, Ltd., Welland.

BRASS AND COPPER BARS, RODS BRAKES, CORNICES
Peck, Stow & Wilcox Co., Southington, Conn.

BRASS FOUNDERS
Canada Metal Co., Toronto.
Greenleafs, Ltd., Belleville, Ont.
St. Lawrence Welding Co., Montreal.
Tallman Brass & Metal Co., Hamilton.
Wilson & Co., J. C., Belleville, Ont.

BRASS WORKING MACHINERY
Foster Machine Co., Elkhart, Ind.
Garlock-Walker Machinery Co., Toronto.
Warner & Swasey Co., Cleveland, O.
Niles Bement Pond Co., New York.
Pratt & Whitney Co., Inc., Toronto, Ont.
Wood Turret Machine Co., Brazil, Ind.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

BRICKS, FIRE
Harbison-Walker Refractories, Montreal.

BRIDGES, RLY. AND HIGHWAY
Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.

BRONZE RODS AND SHEETS, PLATES
Brown's Copper & Brass Rolling Mills, New Toronto

BRONZE, NAVAL
Brown's Copper & Brass Rolling Mills, New Toronto.
Canada Metal Co., Toronto
Tallman Brass and Metal Co., Hamilton.

BRONZE COPPER
Canada Metal Co., Toronto.

BUFFING AND POLISHING MACHINERY
Ford-Smith Mach. Co., Hamilton.
Foss Mchy. & S'ply Co., Geo. F. Montreal
Garlock-Walker Machinery Co., Toronto.
Williams & Wilson, Limited, Montreal.

BUCKETS, DUMP
MacKinnon Steel Co., Sherbroooke, Que.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

BUCKETS, ELEVATOR
Can. Link-Belt Co., Toronto, Ont.
MacKinnon Steel Co., Sherbrooke, Que.

BUCKETS, CLAM SHELL, CRAB, DUMP
Can. Link-Belt Co., Toronto, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Ltd., Walkerville.

BULLDOZERS
Bertram & Sons Co., John, Dundas.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto.
Williams & Wilson, Limited, Montreal.

BURNERS, OIL AND NATURAL GAS
Northern Crane Works, Ltd., Walkerville.

BURRS, IRON AND COPPER
Parmenter & Bulloch Co., Gananoque.

BUSHINGS, BRONZE
Morrow Screw & Nut Co., John, Ingersoll.

CALIPERS
Brown & Sharpe Mfg. Co., Providence, R.I.
Pangborn Corporation, Hagerstown, Md.
Peck, Stow & Wilcox Co., Southington, Conn.

CABINETS, SAND BLAST
Pangborn Corporation, Hagerstown, Md.

CABLE, ELECTRIC
International Machinery & Supply Co., Ltd., Montreal, Que.

CALKS, BOOT
Loftkin Rule Co., of Can., Windsor, Ont.

CANADA SILVER SHEETS, ROLLS
Brown's Copper & Brass Rolling Mills, New Toronto

CANNERS' MACHINERY
Silas, E. W. Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Can.

CANNERS' CONVEYORS
Can. Link-Belt Co., Toronto, Ont.
Wilson & Co., J. C., Belleville, Ont.

CARBIDE
Union Carbide Co., Toronto, Ont.

CARBONIZING BOXES
Can. Blower & Forge Co., Ltd., Walkerville
Kerr, Douglas, Galt, Ont.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.
Swedish Crucible Steel Co., Windsor.

CARRIERS, PNEUMATIC TUBE
Jones & Glassco, Montreal

CARS, INDUSTRIAL
Can. Blower & Forge Co., Kitchener, Ont
Can. Fairbanks-Morse Co., Ltd., Montreal
Eng. Steel & Metals, Welland, Ont.
Mach. Tools Corp., Sherbrooke, Que.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

CASTINGS, MACHINERY
Wilson & Co., J. C., Belleville, Ont.

CASTINGS, ALUMINUM, BRASS BRONZE, COPPER, AND GUN METAL
Algoma Steel Corp., Sault Ste. Marie.
Brockville Foundry Co., Brockville, Ont.
Franklin Mfg. Co., Syracuse, N.Y.
Canada Metal Co., Ltd., Toronto, Ont.

CASTINGS, DIE CAST
Canada Metal Co., Ltd., Toronto, Ont.
Franklin Mfg. Co., Syracuse, N.Y.

CASTINGS, STEEL—ALL KINDS
Electric Steel & Metals Co., Welland.
Fellows Bros., Ltd., Chadley Heath, Eng.

CARRIERS COUPLING BOLTS
John Morrow Screw & Nut Co., Ingersoll
Alexander Fleck, Ltd., Ottawa, Ont.
Greenleafs Ltd., Belleville, Ont.
St. Lawrence Welding Co., Montreal.
Tallman Brass & Metal Co., Hamilton.

CASTINGS, BENCH LEG.
Brown & Sharpe Mfg. Co., Providence, R.I.

CASTINGS, BRASS AND IRON
Algoma Steel Corp., Sault Ste. Marie.
International Machinery and Supply Co., Ltd., Montreal, Que.

CASTINGS, BUILDING
Katie Foundry, Galt, Ont.

CASTINGS, GRAY IRON
Bernard Industrial Co., A., Fortierville, Q
Brown & Sharpe Mfg. Co., Providence, R.I.
Brown Boggs Co. Ltd., Hamilton.
Alexander Fleck, Ltd., Ottawa.
Gardner & Son, Robt., Montreal.
Greenleafs, Ltd., Belleville, Ont.
Hull Iron & Steel Foundries, Ltd., Hull
International Malleable Iron Co., Guelph
Kennedy & Sons, Ltd., Wm., Owen Sound.
Katie Foundry, Ltd., Galt, Ont.
Hamilton Co., Wm., Peterboro.
Wilson & Co., J. C., Belleville, Ont.

CASTINGS, PLUMBERS'
Katie Foundry, Galt, Ont.

CASTINGS, NICHROME
Can. Driver-Harris Co., Ltd., Walkerville

CASTINGS, HARDWARE
Katie Foundry, Galt, Ont.

CASTINGS, STEEL CHROME AND MANGANESE STEEL
Thos. Davidson Mfg. Co., Montreal, Que.
Dom. Foundries & Steel, Hamilton, Ont.
Hull Iron & Steel Foundries, Ltd., Hull.
Kennedy & Sons, Ltd, Owen Sound.

CASTINGS, MALLEABLE
International Malleable Iron Co., Guelph

CASTINGS, NICKEL STEEL
Hull Iron & Steel Foundries, Ltd., Hull.

CEMENT MACHINERY
Can. Fairbanks-Morse Co., Ltd., Montreal.
Gardner, Robt., & Son, Montreal.

CEMENT HANDLING MACHINERY
Can. Link-Belt Co., Toronto, Ont.

CENTERING MACHINES
Victoria Foundry Co., Ottawa, Ont.

CENTRE REAMERS
Bertram & Sons Co., John, Dundas.
Gardner, Robt. & Son, Montreal.
Hurlburt, Rogers Mch. Co., South Sudbury, Mass.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. Co., of Canada, Galt, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

CHAIN, WELDED COIL
Fellows Bros., Ltd., Chadley Heath, Eng.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

CHAIN BLOCKS
Aikenhead Hardware Co., Toronto, Ont.
Can. Fairbanks-Morse Co., Ltd., Montreal
Ford Chain Block & Mfg. Co., Phila., Pa.
Garlock-Walker Machy. Co., Toronto.
Morris Crane & HoistCo., Herbert, Niagara Falls, Ont.
Rice Lewis & Son, Toronto, Ont.
Williams & Wilson, Ltd., Montreal, Que.
Jones & Glassco, Montreal, Que.

CHAINS, AGRICULTURAL
Morse Chain Co., Ithaca, New York.

CHAINS, AUTOMOBILE ENGINE
Morse Chain Co., Ithaca, New York.

CHAINS, BOOM, TIMBER
Fellows Bros., Ltd., Chadley Heath, Eng.

CHAINS, BICYCLE, DRIVE AND BLOCK
Morse Chain Co., Ithaca, New York.

CHAINS, FORGED
Fellows Bros., Ltd., Chadley Heath, Eng.

CHAINS, FOR ELEVATORS AND CONVEYORS
Can. Link-Belt Co., Toronto, Ont.
Morse Chain Co., Ithaca, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

CHAIN, MALLEABLE, DETACHABLE AND RIVETED
Can. Link-Belt Co., Toronto, Ont.
Morse Chain Co., Ithaca, N.Y.
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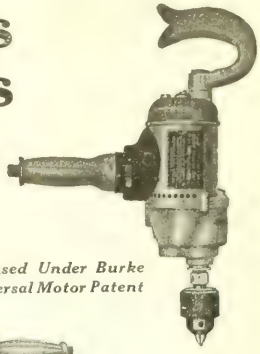

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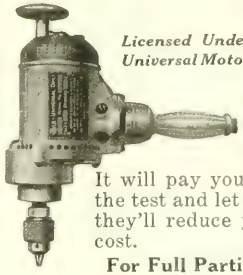

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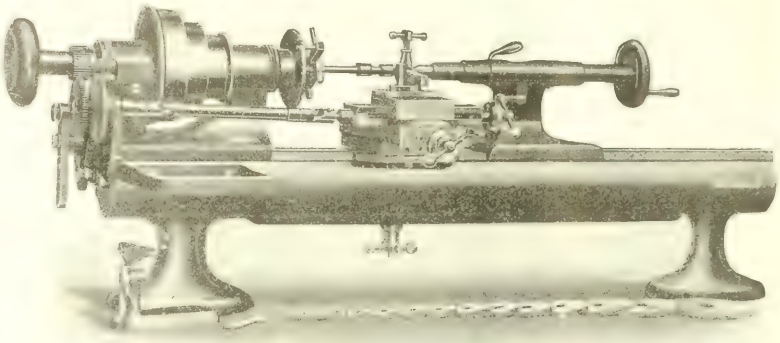

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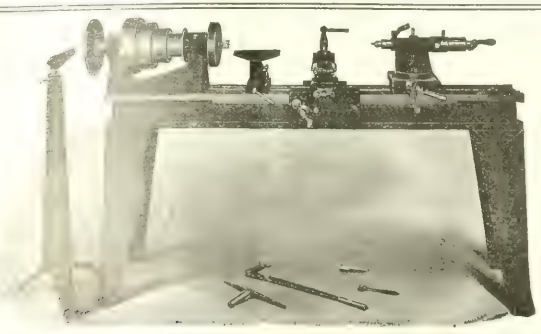

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Whitman & Barnes Mfg Co., Akron, O.
Wilt Twist Drill Co. of Can., Walkerville.

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Gray Mfg. & Mach. Co., Bridgeport, Conn
Garlock-Walker Machinery Co., Toronto.
Greenfield Machine Co., Greenfield, Mass.
Independent Pneumatic Tool Co., Chicago.
United States Elec. Tool Co., Cincinnati.
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Ford-Smith Machine Co.,, Hamilton.
Peerless Machine Co., Racine, Wis.
Racine Tool & Mach. Co., Racine, Wis.
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Sleeper & Hartley, Inc., Worcester, Mass.

NAME PLATES, BRONZE, ETCHED AND STAMPED

Matthews & Co., Jas. H., Pittsburgh, Pa.
Pritchard-Andrews Co., Ottawa, Ont.
Turner Brass Works, Sycamore, Ill.

NICHROME CASTINGS

Can. Driver-Harris Co., Ltd., Walkerville.

NICKEL

Boker & Co., Inc., H., Montreal, Que.
Pilot Steel & Tool Co., Montreal, Que.

NICKEL SILVER

Brown's Copper & Brass Rolling Mills, New Toronto, Ont.

NICKEL STEEL

See Steel.

NIPPLE HOLDERS

Curtis & Curtis Co., Bridgeport, Conn.

NIPPLE THREADING MACHINES

Hall & Sons, Ltd., John H., Brantford.
Landis Machine Co., Waynesboro, Pa.

NITROGEN

Carter Welding Co., Toronto, Ont.

NUTS, STEEL, CASTELLATED AND COLD PRESSED

Galt Machine Screw Co., Ltd., Galt, Ont.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Williams & Co., J. H., Brooklyn, N.Y.

NUTS, SEMI-FINISH AND FINISHED

Galt Machine Screw Co., Galt, Ont.
National-Acme Co., Cleveland, Ohio.
Wilkinson & Kompass, Hamilton.

NUT BURRING AND NUT MACHINES (HOT)

National Machy. Co., Tiffin, Ohio.

NUT FACING AND BOLT SHAVING MACHINES

Garvin Machine Co., New York.
National Machinery Co., Tiffin, Ohio.
Victor Tool Co., Waynesboro, Pa.
Williams & Wilson, Ltd., Montreal, Que.

NUT TAPPERS

Bertram & Sons Co., John, Dundas, Ont.
Canada Machinery Corp., Galt, Ont.
Garvin Machine Co., New York.
Hall & Son, J. H., Brantford, Ont.
Jardine & Co., A. B., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.
Williams & Wilson, Ltd., Montreal, Que.

OIL SEPARATORS

Can. Fairbanks-Morse Co., Montreal.

OIL STONES

Aikenhead Hardware Co., Toronto, Ont.
Carborundum Co., Niagara Falls, N.Y.
Norton Co., Worcester, Mass.
Rice Lewis & Son, Toronto, Ont.

OIL STONE GRINDERS

Oliver Machy. Co., Grand Rapids, Mich.

OIL STORAGE SYSTEMS

Bowser & Co., Inc., S. F., Toronto, Ont.

OPENING DIE HEADS

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Brantford Oven & Rack Co., Brantford.

OVEN TRUCKS, STEEL

Brantford Oven & Rack Co., Brantford.
MacKinnon Steel Co., Sherbrooke, Que.

OVENS FOR DRYING, TEMPER AND OXYGEN, ELECTROLYTIC CELLS UNDER TRUCKS

Welding & Supplies Co., Montreal, Que.
Brantford Oven & Rack Co., Brantford.

OXY-ACETYLENE WELDING AND CUTTING AND OUTFITS

Carter Welding Co., Toronto, Ont.
Prest-o-Lite Co., Inc., Toronto, Ont.
St. Lawrence Welding Co., Montreal, Que.
Welding & Supplies Co., Montreal, Que.

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Cleveland Wire Spring Co., Cleveland.

PACKINGS, LEATHER, HYDRAULICS, ETC.

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Perrin, Ltd., William, Toronto.

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Frost Mfg. Co., Chicago, Ill.

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Can. Link-Belt Co., Toronto, Ont.
MacKinnon Steel Co., Sherbrooke, Que.

PARTITIONS, WIRE

See Guards

PAPER MILL MACHINERY

Garlock-Walker Machinery Co., Toronto.
MacKinnon Steel Co., Sherbrooke, Que.

PATTERN SHOP EQUIPMENT

Canada Machinery Corp., Galt, Ont.
Oliver Machy. Co., Grand Rapids, Mich.
Fox Machine Co., Jackson, Mich.
Garlock-Walker Machinery Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PATTERN MAKERS' LATHES

See Lathes.

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Fetherstonhaugh & Co., Ottawa.
Marion & Marion, Montreal.
Ridout & Maybee, Toronto.
Wilson & Co., C., Belleville, Ont.

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Marten Machine Co., Hamilton, Ont.
Can. Link-Belt Co., Toronto, Ont.

PENSTOCKS

William Hamilton Co., Peterboro, Ont.

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Williams & Wilson, Ltd., Montreal, Que.

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West Tire Setter Co., Rochester, N.Y.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

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Can. Blower & Forge Co., Kitchener, Ont.
Can. Fairbanks-Morse Co., Montreal.
Gardner & Son, Robert, Montreal.
A. B. Jardine & Co., Hespeler, Ont.
Marshall, Son & Blunney, Toronto.
Marten & Hunter, Hamilton, Ont.
Peck, Stow & Wilcox Co., Southington, Ct.
Pilot Steel & Tool Co., Montreal, Que.
Pratt & Whitney Co., Dundas, Ont.
Stoll Co., D. H., Buffalo, N.Y.
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Niles-Bement-Pond Co., New York.

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Williams & Wilson, Ltd., Montreal, Que.

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Plewes, Ltd., Winnipeg, Man.
Pratt & Whitney Co., Dundas, Ont
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Gisholt Machine Co., Madison, Wis.
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Marshall, Son & Bunney, Toronto.
Morrow Screw & Nut Co., J., Ingersoll, Ont
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Garlock-Walker Machinery Co., Toronto.
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Niles-Bement-Pond Co., New York.

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Garlock-Walker Machinery Co., Toronto.
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Toledo Machine & Tool Co., Toledo, O.
Williams & Wilson, Ltd., Montreal, Que.

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The Quickwork Co., St. Mary's, Ohio.

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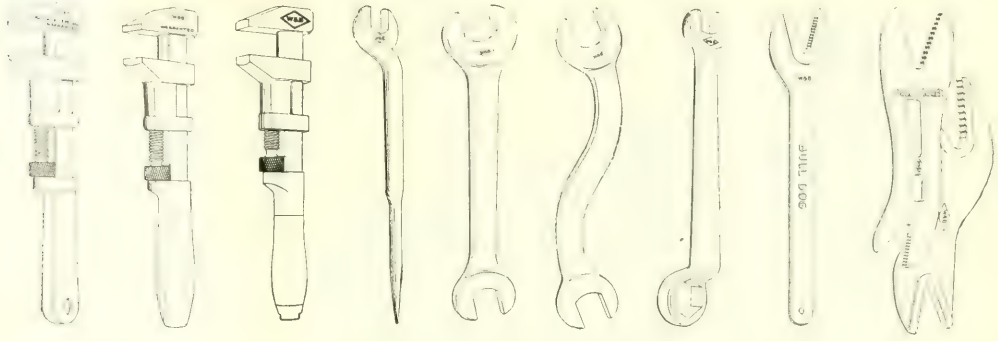

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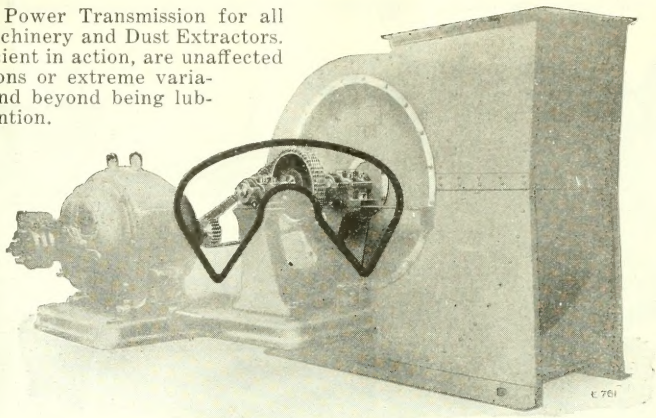

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WIRE, COPPER, CLAD STEEL WIRE, LINK FABRIC
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Page Steel & Wire Co., Adrian, Mich.

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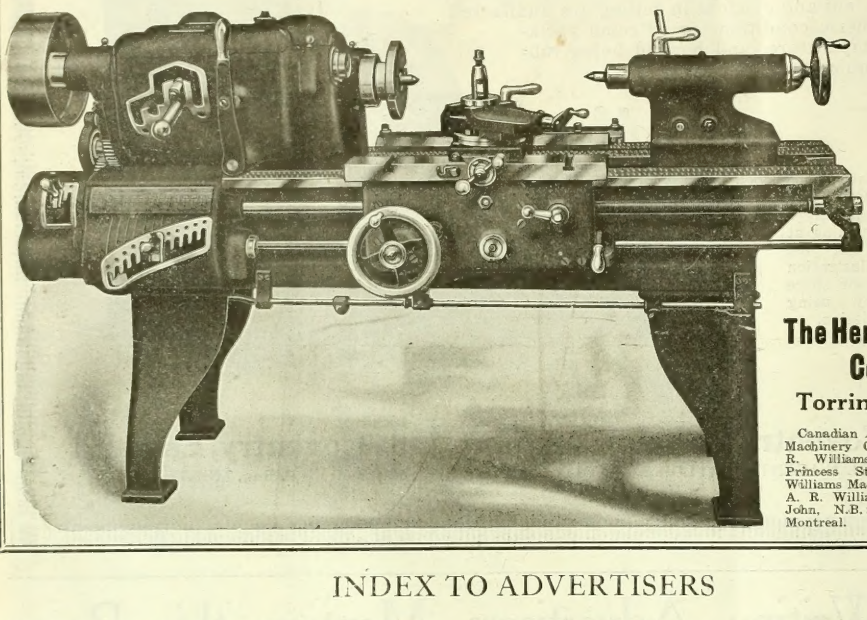

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Foss QUALITY Foss SERVICE Foss

CUTS THAT SAVE
Time, Labor and Money
by using the
WALLACE BENCH SAW

Portable

Quickly Adjusted

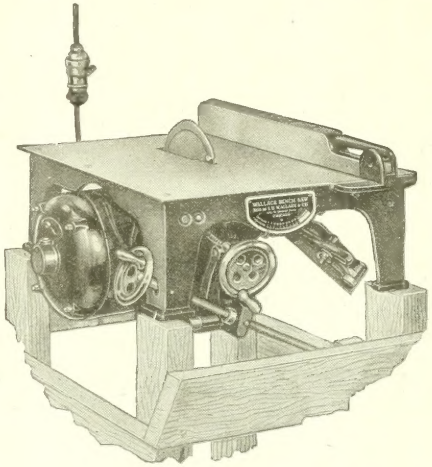
Universal Type

Dynamically Balanced

Cuts 45° Both Ways at One Time

Avoids Spoiled Work

Saw Tilts Instead of Table



Cuts at Any Angle

Cross Cut or Rip

Driven by ½ H.P. Motor, Either Alternating or Direct Current

Handles 80% of Your Cutting Work at Minimum Cost

It's *the* Saw That Every Keen Management Has Been Looking For

SPECIFICATIONS

Diameter of Saw	7 Inches
Size of Table	17 x 20 Inches
Size of Motor	½ Horse Power
Weight of Saw, Including Motor	115 lbs.
Shipping Weight	150 lbs.
Speed of Saw	5,200 R.P.M.
Height—Foot to Table Top	6⅞ Inches
Height—Including Stand	36 Inches

Send for Illustrated Descriptive Circular.

Canadian Distributors:

The Geo. F. Foss Machinery & Supply Co., Limited

305 St. James Street Montreal, Que.

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Foss QUALITY Foss SERVICE Foss

Another Way of Looking At It

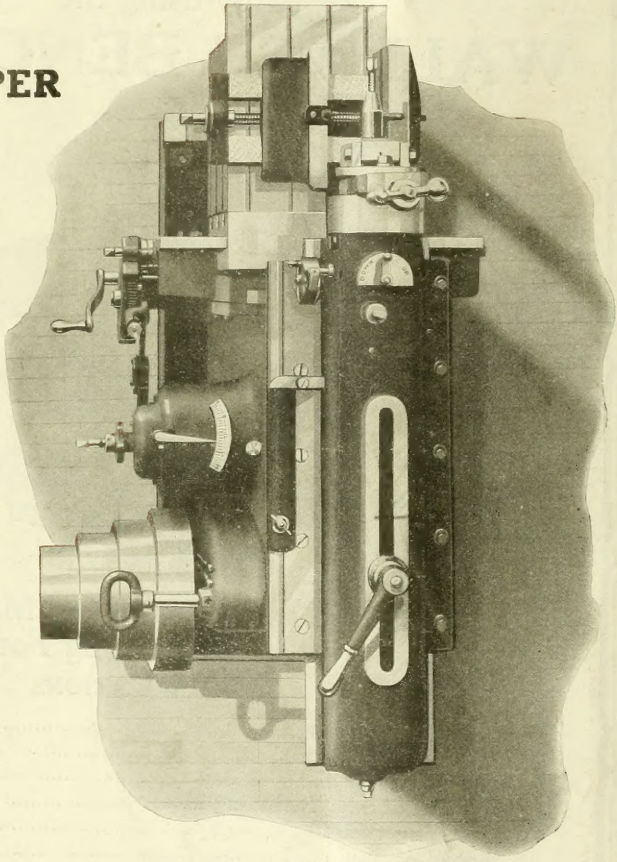
C.M.C.

20" x 22" SHAPER

DOWN FEED TO HEAD

VISIBLE STROKE INDICATOR

GEAR CHANGE



C.M.C.

C.M.C. Shapers look good from every point of view. Every change of angle serves only to display new features of advantage.

CANADA MACHINERY CORPORATION, GALT, ONTARIO

LIMITED

Toronto Office and Warerooms: Brock Avenue Subway